

NEW

2 GREAT WAYS TO LEARN!

212 PAGES OF GUIDES • 45+ MINS OF VIDEO TUTORIALS

Canon

**IN-DEPTH
PRACTICAL
GUIDES**

Photographer's Handbook

- Canon EOS camera skills
- Canon School series
- New camera & gear tests
- Creative photo projects

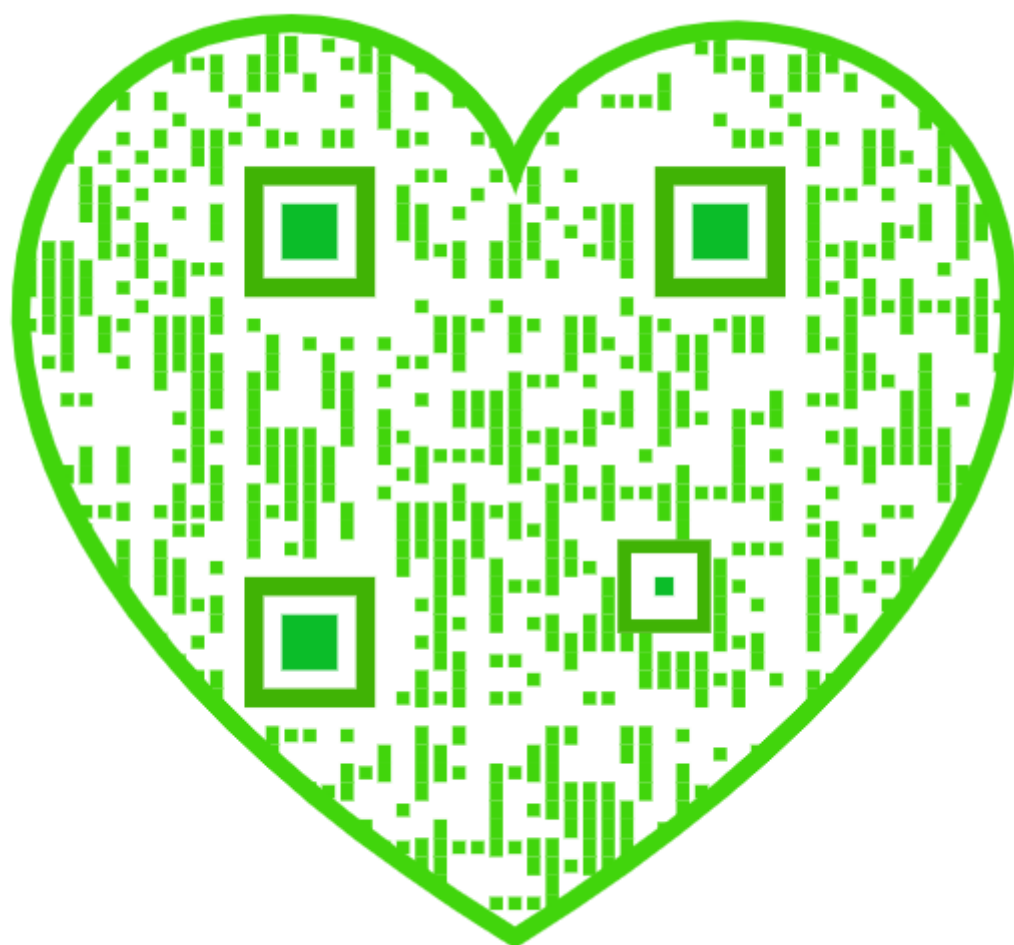


100% UNOFFICIAL

**Digital
Edition**

FUTURE

TENTH
EDITION



Canon Photographer's Handbook

Welcome to the new *Canon Photographer's Handbook* your in-depth guide to take your Canon photography to the next level. Whether you've just bought your first EOS camera, or are a serious enthusiast, you'll discover essential camera tips and techniques to help you master your Canon EOS DSLR or EOS R mirrorless camera in no time. The following sections are packed with expert advice; **Camera Skills** includes guides on getting perfect exposures to learning how to use different lenses for better results. In **Canon School** we go really in-depth into key camera settings, including aperture, shutter speed and ISO control. In **Photographer's Apprentice**, see how fellow amateurs learn how to shoot specific photography subjects and scenes, by spending a day with a top Canon professional photographer. While in our **Photo Projects** section we provide inspiration and creative topics to photograph, accompanied by free video guides that you'll find on FileSilo. We round things off with our **Gear Tests**, which include big reviews of Canon's current EOS mirrorless camera range, plus expert tests of the new EOS R5 Mark II, and the top-of-the-tree EOS R1. We hope you enjoy reading this *Canon Photographer's Handbook* and it helps you to start improving your photography today.



「 FUTURE 」

Canon Photographer's Handbook

Future PLC Quay House, The Ambury, Bath, BA1 1UA

Bookazine Editorial

Editor **Peter Travers**

Designer **Emma Wood**

Compiled by **Sarah Bankes & Adam Markiewicz**

Head of Art & Design **Greg Whitaker**

Editorial Director **Jon White**

Managing Director **Grainne McKenna**

PhotoPlus Editorial

Editor **Peter Travers**

Art Editor **Martin Parfitt**

Content Director **Chris George**

Photography

All copyrights and trademarks are recognised and respected

Advertising

Media packs are available on request

Commercial Director **Clare Dove**

International

Head of Print Licensing **Rachel Shaw**

licensing@futurenet.com

www.futurecontenthub.com

Circulation

Head of Newstrade **Tim Mathers**

Production

Head of Production **Mark Constance**

Production Project Manager **Matthew Eglinton**

Advertising Production Manager **Joanne Crosby**

Digital Editions Controller **Jason Hudson**

Production Managers **Keely Miller, Nola Cokely,
Vivienne Calvert, Fran Twentyman**

Printed in the UK

Distributed by Marketforce - www.marketforce.co.uk

For enquiries, please email: mfcommunications@futurenet.com

GPSR EU RP (for authorities only)

eucomply OÜ Pärnu mnt 139b-14 11317, Tallinn, Estonia

hello@eucompliancepartner.com, +3375690241

Canon is a trademark of Canon Inc, registered in the U.S. and other countries.
Canon Inc © 2025

Canon Photographer's Handbook Tenth Edition (PTB6616)

© 2025 Future Publishing Limited

We are committed to only using magazine paper which is derived from responsibly managed, certified forestry and chlorine-free manufacture. The paper in this bookazine was sourced and produced from sustainable managed forests, conforming to strict environmental and socioeconomic standards. .

All contents © 2025 Future Publishing Limited or published under licence. All rights reserved. No part of this magazine may be used, stored, transmitted or reproduced in any way without the prior written permission of the publisher. Future Publishing Limited (company number 2008885) is registered in England and Wales. Registered office: Quay House, The Ambury, Bath BA1 1UA. All information contained in this publication is for information only and is, as far as we are aware, correct at the time of going to press. Future cannot accept any responsibility for errors or inaccuracies in such information. You are advised to contact manufacturers and retailers directly with regard to the price of products/services referred to in this publication. Apps and websites mentioned in this publication are not under our control. We are not responsible for their contents or any other changes or updates to them. This magazine is fully independent and not affiliated in any way with the companies mentioned herein.



FUTURE

Connectors.
Creators.
Experience
Makers.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR)
www.futureplc.com

Chief Executive Officer **Kevin Li Ying**
Non-Executive Chairman **Richard Huntingford**
Chief Financial Officer **Sharjeel Suleman**

Tel +44 (0)1225 442 244

Part of the

PhotoPlus
bookazine series



CONTENTS





Camera skills

Master your camera now!	10
Get to grips with lenses	22
Master your EOS in 12 hours	34
Sports skills	44
Perfect portraits	54

Canon school

Understanding exposure	64
How to handle your Canon	70
The importance of aperture	76
The need for shutter speed	82
Understanding ISO	88
In-camera metering	94
The importance of white balance	100
Awesome AF points	106

Photographer's Apprentice

Reach the peak	112
Modern family	122
Great Gower seascapes	134

Projects

The light fantastic	146
Perfect portraits	150
Hyperfocally speaking	152
Illuminate still life	156
Create brilliant black & white images	160
In-flight entertainment	164
Out of the shadows	168

Gear tests

Canon EOS R system cameras	174
Canon EOS R5 Mark II	186
Canon EOS R1	194
HÄHNEL Modus 600RT Wireless Kit	202
Photo backpacks	204
Sturdy tripods	206

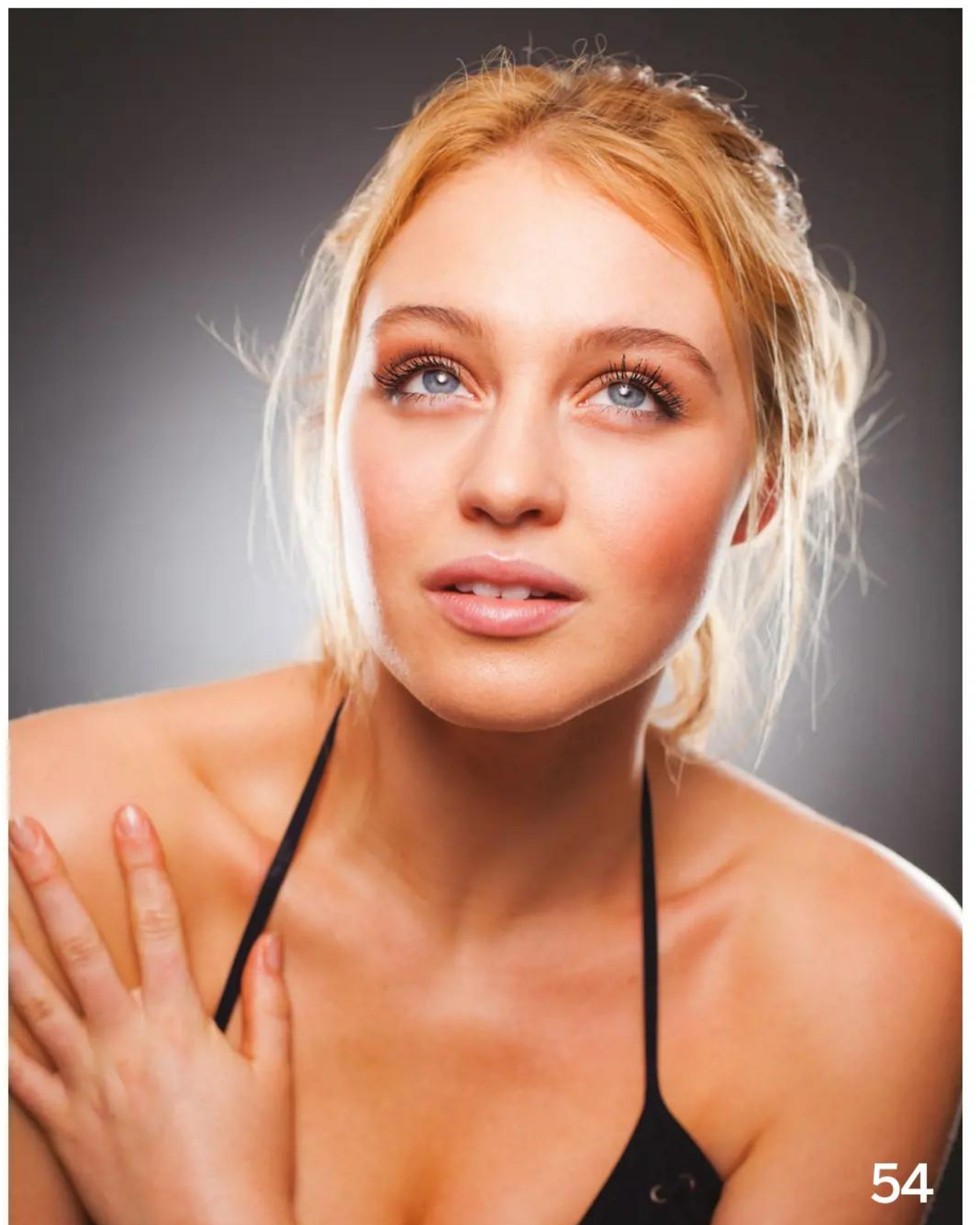


Download free videos
Learn more with our video tutorials **210**

Camera skills

Master your camera now!	10
Get to grips with lenses	22
Master your EOS in 12 hours	34
Sports skills	44
Perfect portraits	54







MASTER YOUR CAMERA NOW!

Get to know your camera and what it has to offer – and start taking your best shots ever!

Nothing beats the feeling you get when all the elements in front of your camera come together in perfect harmony, and create the perfect image. With all the right settings in place, reviewing that once-in-a-lifetime shot on the rear screen can give you a real buzz. All because of a little luck, and an understanding of what settings are needed for different situations.

If you're new to photography, or if you simply want to brush up on a few skills, you're in the right place. We're going to take you through everything you need to know to immediately start taking better photos. By the time you've finished reading, your photography skills will be ready for anything.



1 Get to know your camera

The first step towards technical and creative prowess is to get to know the basic settings and functions on your camera. You don't need to know everything, but having an idea of what the buttons and dials are for will not only make you feel more confident, it'll also mean

you know how to access different settings as you need them. Canon EOS models are slightly different, and advanced models offer controls that the more basic options don't, but their layout is extremely similar. So let's take a look at what you need to know...

01 LCD screen

The LCD screen is extremely useful and can be used to compose shots, to review your photos and also to navigate menus and view settings. Many Canon DSLRs now have touchscreen LCDs.

02 Dioptic adjustment knob

If you wear glasses but would prefer not to while shooting, this control can adjust the viewfinder to your vision. Use autofocus to focus on a subject, then rotate the wheel until the subject is sharp in the viewfinder.

03 Zoom buttons

These buttons are found next to the LCD screen or above the thumbplate on the back of the camera, depending on the model. They are used to zoom in and out of images during playback and in Live View.



04 Menu button

Canon cameras offer a wide range of settings, features and customisation options. Press the Menu button to bring up the main menu options on your rear LCD, then go through sub-menus for the setting you want.

05 Cross keys/D-pad

Depending on your EOS model, there will either be cross keys or a D-pad. These are used to navigate menus and settings, particularly if your camera doesn't have a touchscreen LCD. There may also be a thumbwheel.

06 Playback button

Press this button when you want to review the image you just shot on your rear LCD. You can view older images, too, if they're still on the camera, using the cross keys, D-pad or touchscreen LCD.

07 Quick menu

Access your most commonly used settings fast with this control. This option makes changing settings quick and easy, and removes the need to navigate the main menu and through sub-menus.



08 Shutter button

Pressing the shutter button releases the shutter to take a photo. Half-depress the button to the point of resistance to activate autofocus, then fully depress the button to take the photo.

09 Infrared shutter release

In addition to the shutter button, Canon DSLRs can be fired remotely, either with an infrared remote that triggers this sensor on the front of the camera, or via a cable that plugs into a port on the side.

10 Lens release button

When you attach a lens to a camera, it remains locked in position so it doesn't fall off. To remove a lens to fit another, you have to press the lens release button and rotate the lens to remove it from the body.

11 Flash button

The flash button is used to activate the pop-up flash. While it's on the top of the body on this camera, on others it can often be found to the left of the viewfinder, just below the flash itself.



12 Main dial

Use this to adjust settings like shutter speed and aperture while you're shooting. The setting the Main dial affects depends on the mode you've chosen on the Mode dial.

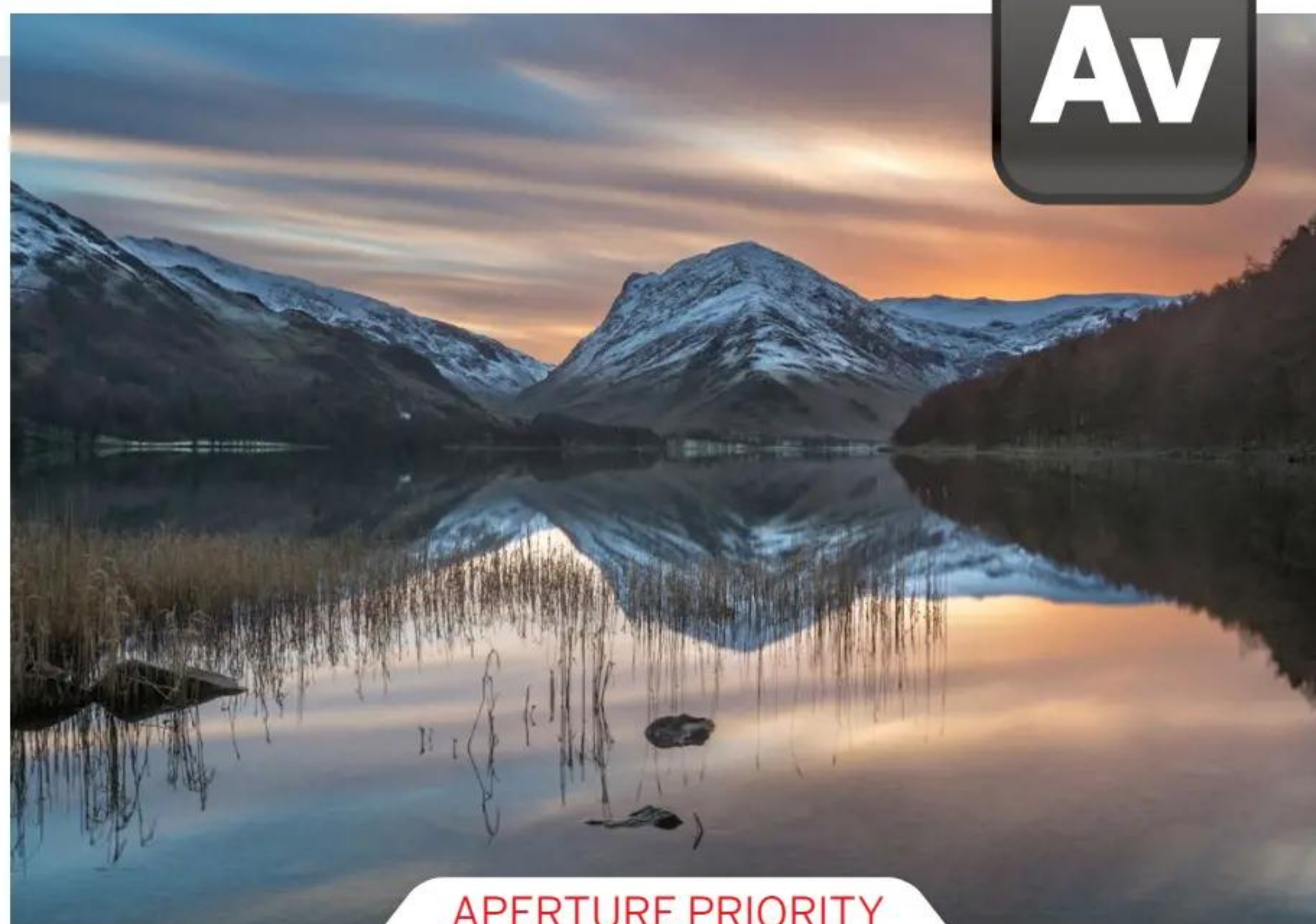
13 Mode dial

Turning the Mode dial allows you to select the shooting mode. These range from fully automatic to semi-automatic, where you take control of 95% of settings, to fully manual, where you control everything.

14 Hotshoe

The hotshoe is an attachment that's used primarily for fitting an external flash to your camera. They can also be used to attach accessories including wireless flash triggers and microphones for video.

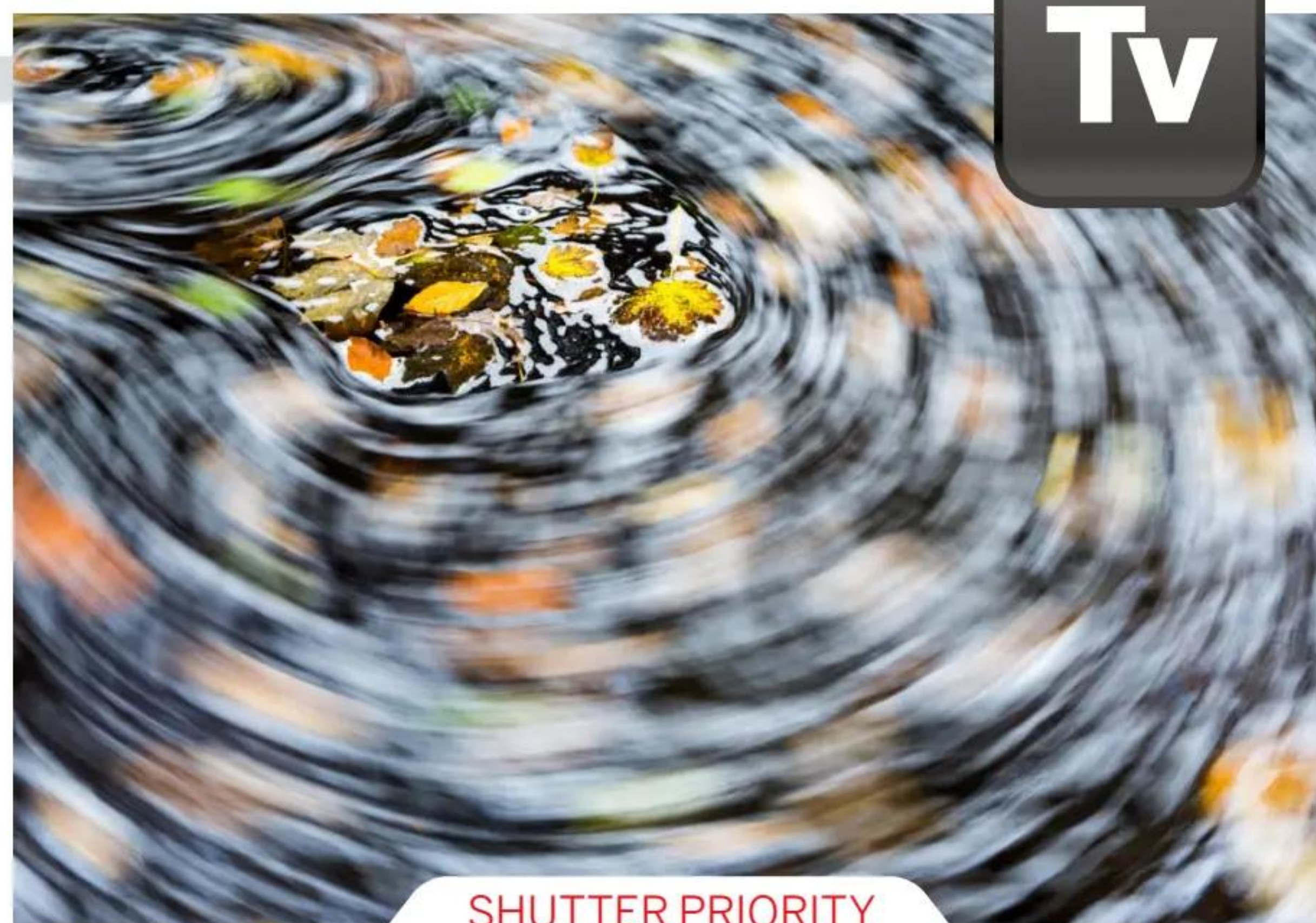
Av



APERTURE PRIORITY

Aperture Priority is best for subjects where controlling depth of field is necessary, such as landscapes (large depth of field) and portraits (shallow depth of field)

Tv



SHUTTER PRIORITY

Shutter Priority is your best choice when having control over shutter speed is important, such as when freezing movement (fast shutter speed) or blurring movement (slower shutter speed)

2 Shooting modes

Most cameras feature a range of shooting modes, which you can choose based on preference, what you're shooting or how experienced you are. Auto (shown on the Mode dial as a green square) takes care of everything for you: you just have to point and shoot. Program (P) mode takes care of shutter speed and aperture, while you set

options like ISO, metering modes and white balance. Then there are the semi-automatic modes: Aperture Priority (Av) and Shutter Priority (Tv). With Aperture Priority, you select the aperture and the camera sets the appropriate shutter speed. Shutter Priority selects an aperture based on the shutter speed you set. These modes allow you to take

control of the setting that's most important to your shot.

Manual mode (M) requires you to take control of all settings, including both aperture and shutter speed. This is only really necessary when shooting a handful of advanced techniques, but it's worth taking the time to master this mode.

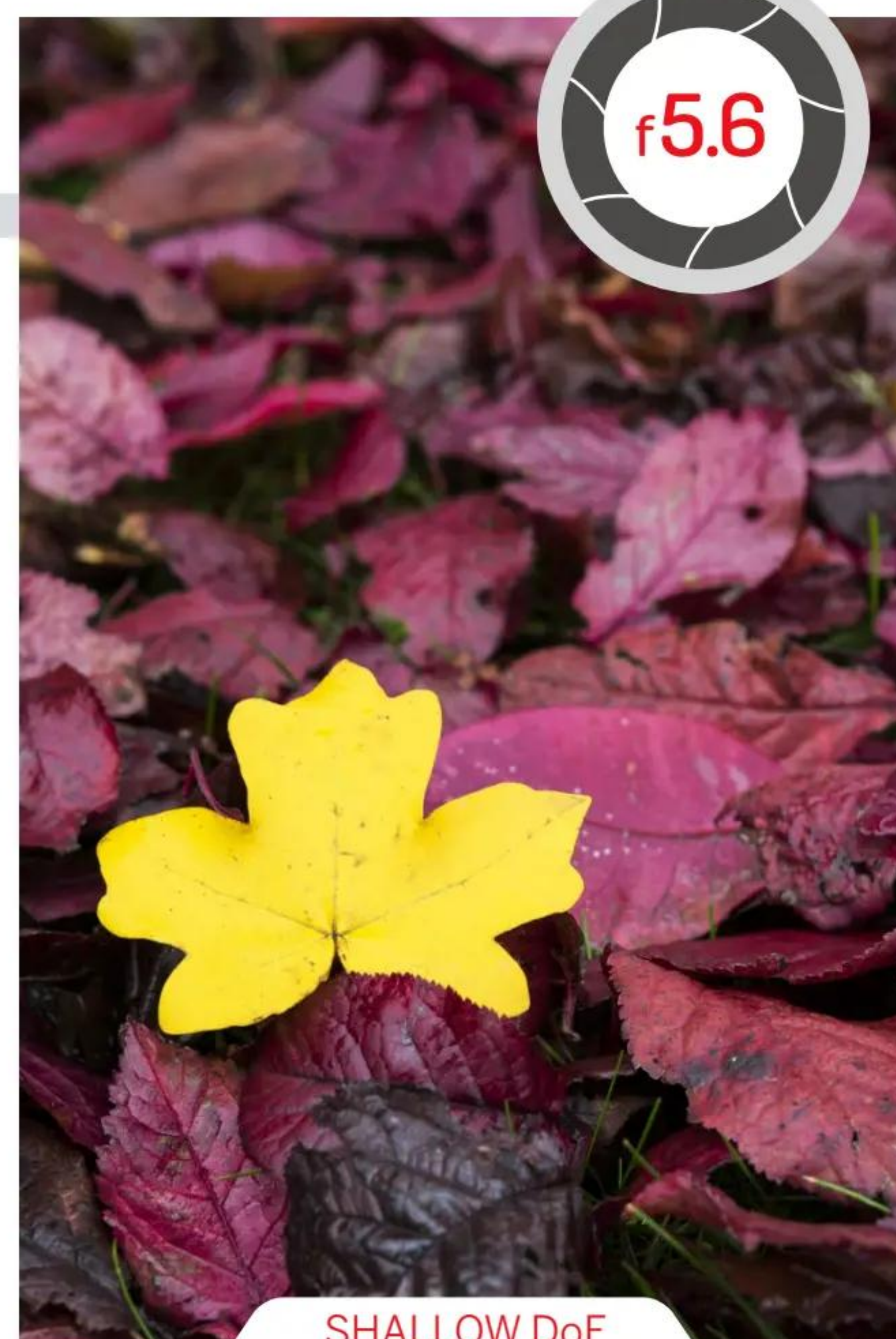
3 Control depth of field with the aperture

Depth of field simply refers to how much of the depth of the image is in acceptably sharp focus. Wide aperture settings, such as f/2.8, create an extremely shallow depth-of-field, which is perfect for portraits where you want the subject to be sharp and the background to be blurred. For landscape shots, however, you want as much of the scene to be in focus as possible, so using an aperture around f/16 will provide much more front-to-back sharpness.



LARGE DoF

Using a narrow aperture has captured a greater depth of sharpness



SHALLOW DoF

A wider aperture has isolated focus on the subject in the foreground



FASTER SHUTTER SPEED

A fast shutter speed has completely frozen the passing car, resulting in a dull and static image

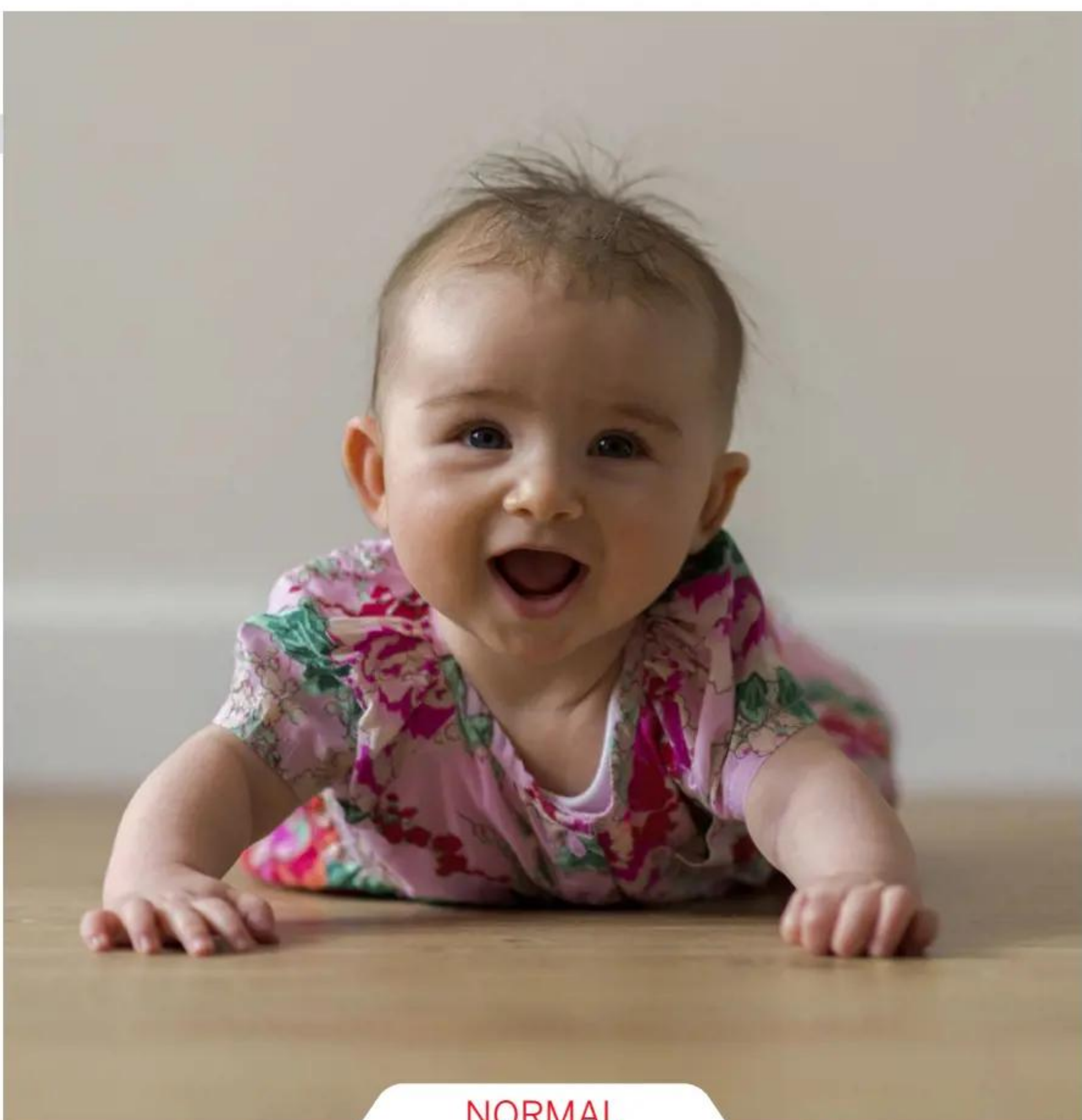


SLOWER SHUTTER SPEED

A slow shutter speed and a 'panning' technique have captured a dynamic motion blur

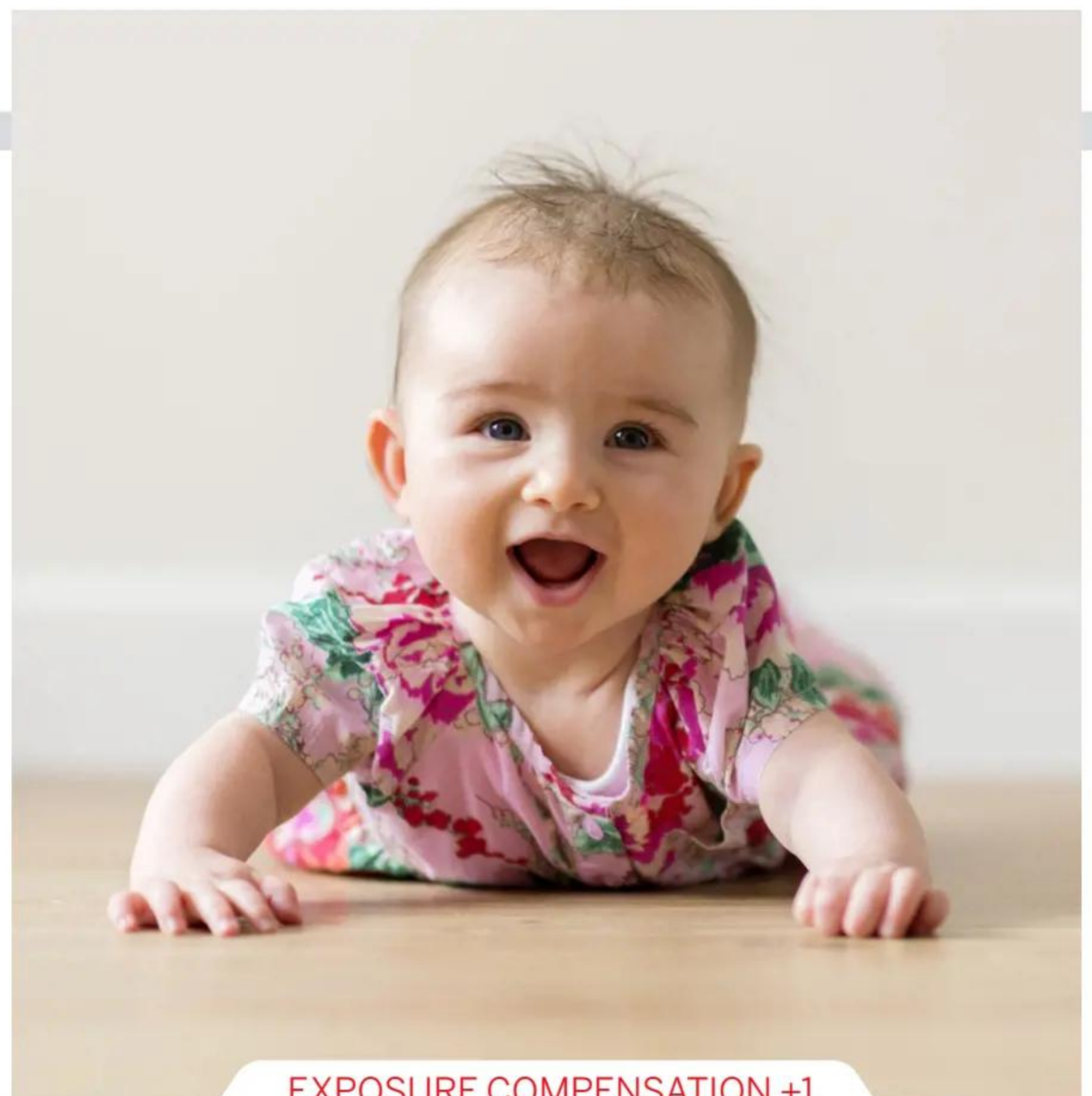
4 Control motion blur with the shutter speed

Shutter speed is an incredibly creative control that can be used to freeze fast-moving subjects in space and time, or capture them as a more artistic blur. For action photography, these two options provide a wealth of possibilities. For instance, shooting a passing car at 1/1000 sec will 'freeze' it, making it appear not to be moving, while tracking the car as it passes at 1/125 sec will capture dynamic blur in the background. To learn more about this, take a look at Tip 15.



NORMAL

With a predominantly light scene, the camera metering has been fooled into underexposure, which has made the image too dark



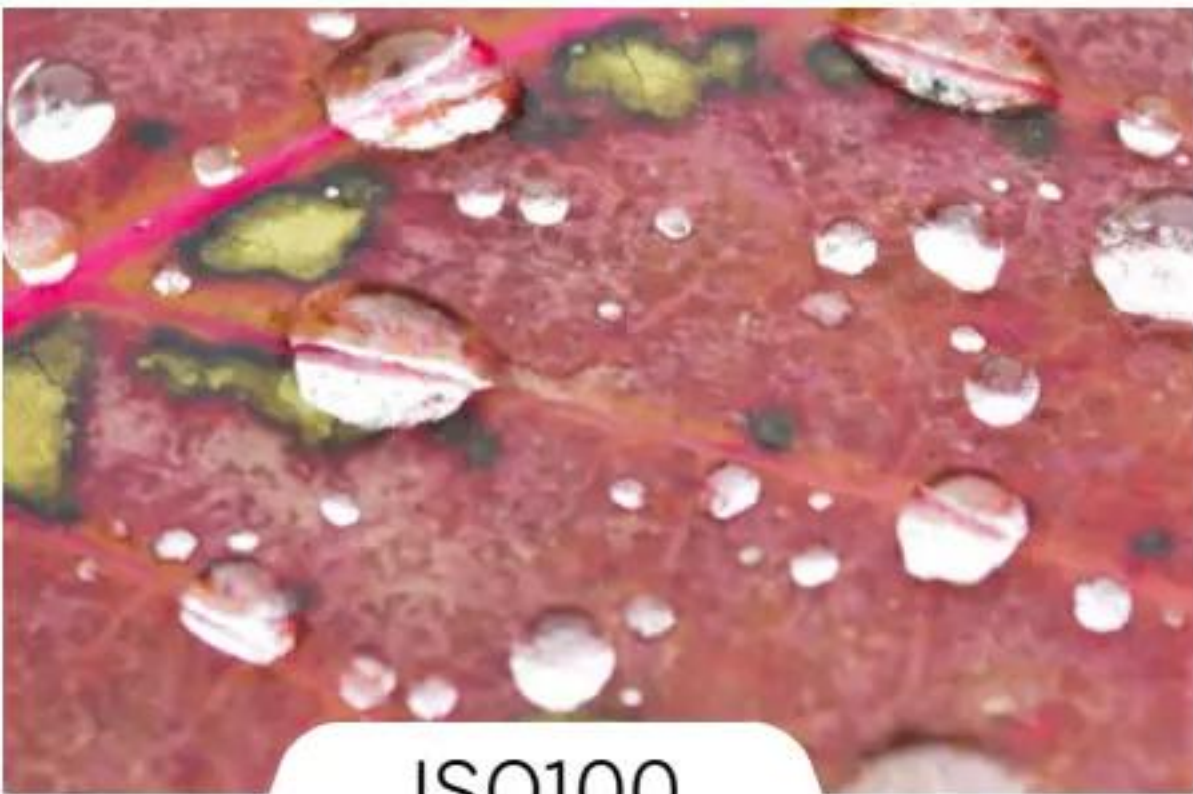
EXPOSURE COMPENSATION +1

By adding one stop of overexposure using exposure compensation, the camera exposure has been made as bright as it should be

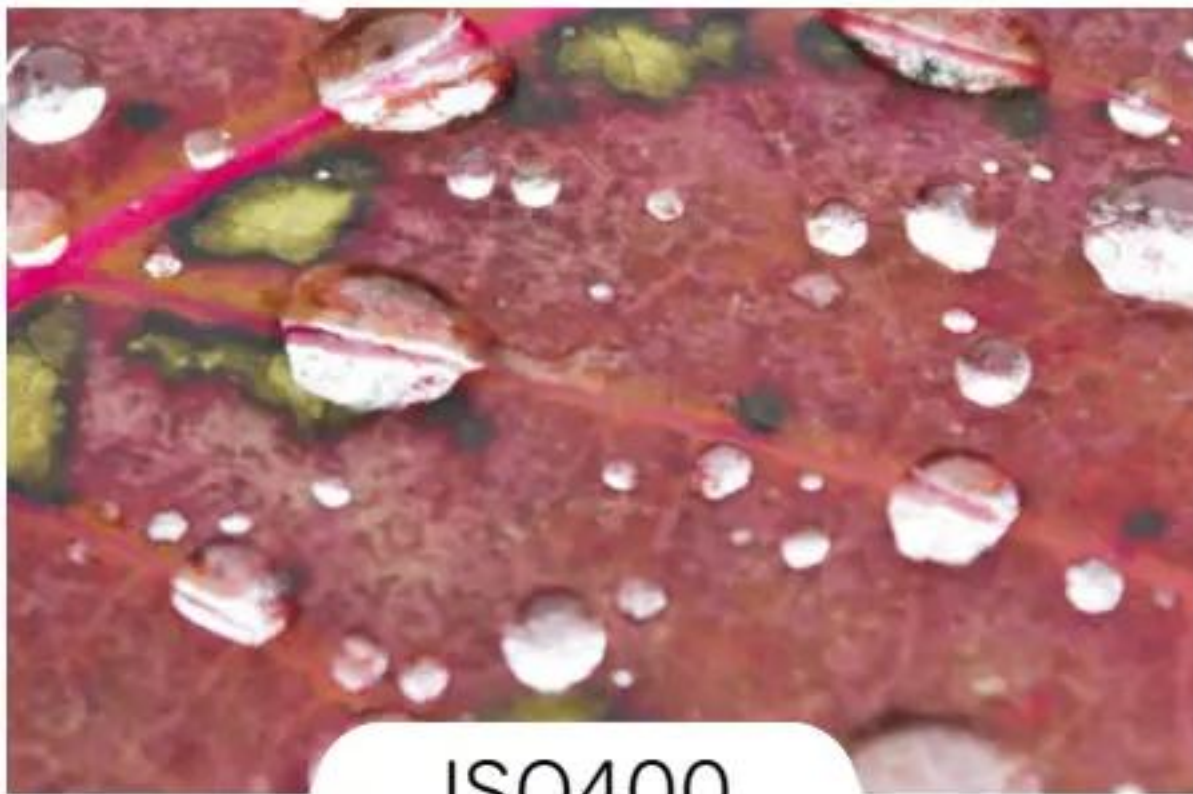
5 Exposure compensation

When you shoot in Aperture Priority or Shutter Priority modes, your camera will always assume that the subject is a midtone. The problem is that if you're shooting a subject that's lighter or darker than mid-grey, or is against a background lighter or darker than mid-grey,

the image will over- or underexposed. Exposure compensation allows you to override the camera's automatic assumptions, which means you can lighten or darken exposure to correct the problem. It basically provides manual control with the convenience of semi-automatic.



ISO100



ISO400



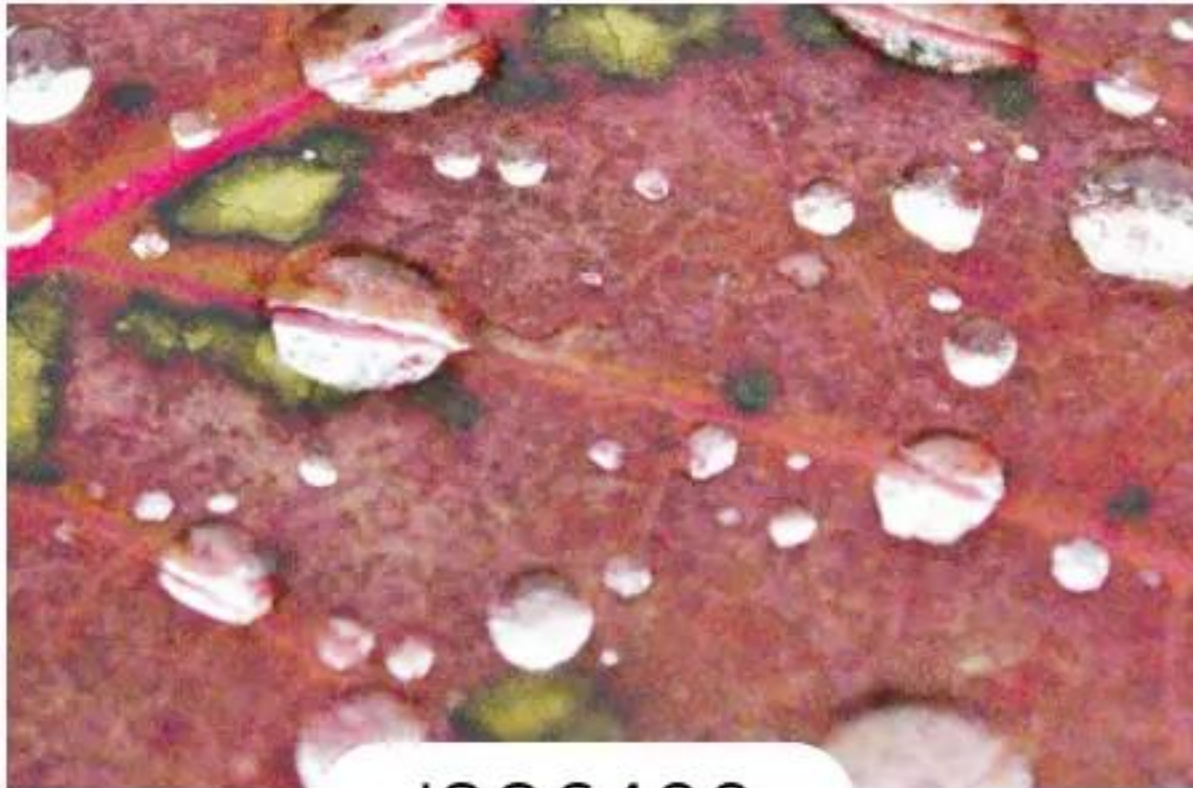
ISO800



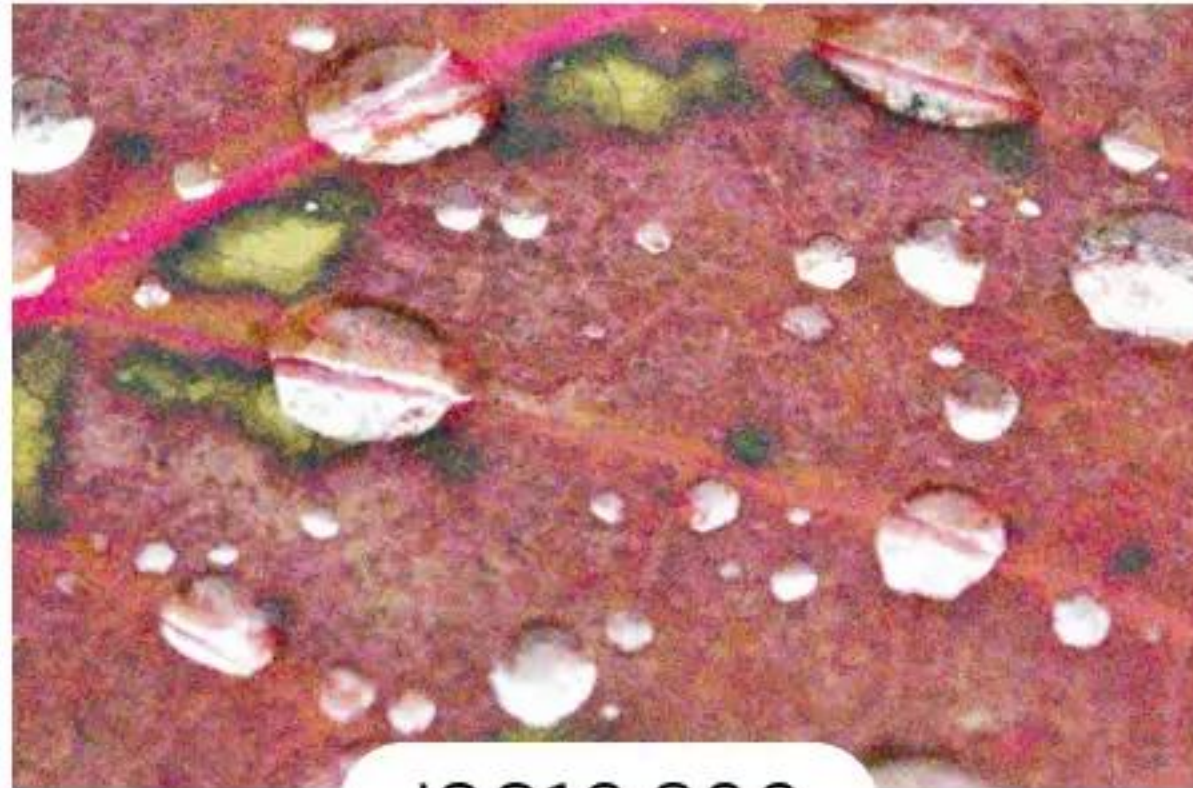
ISO1600



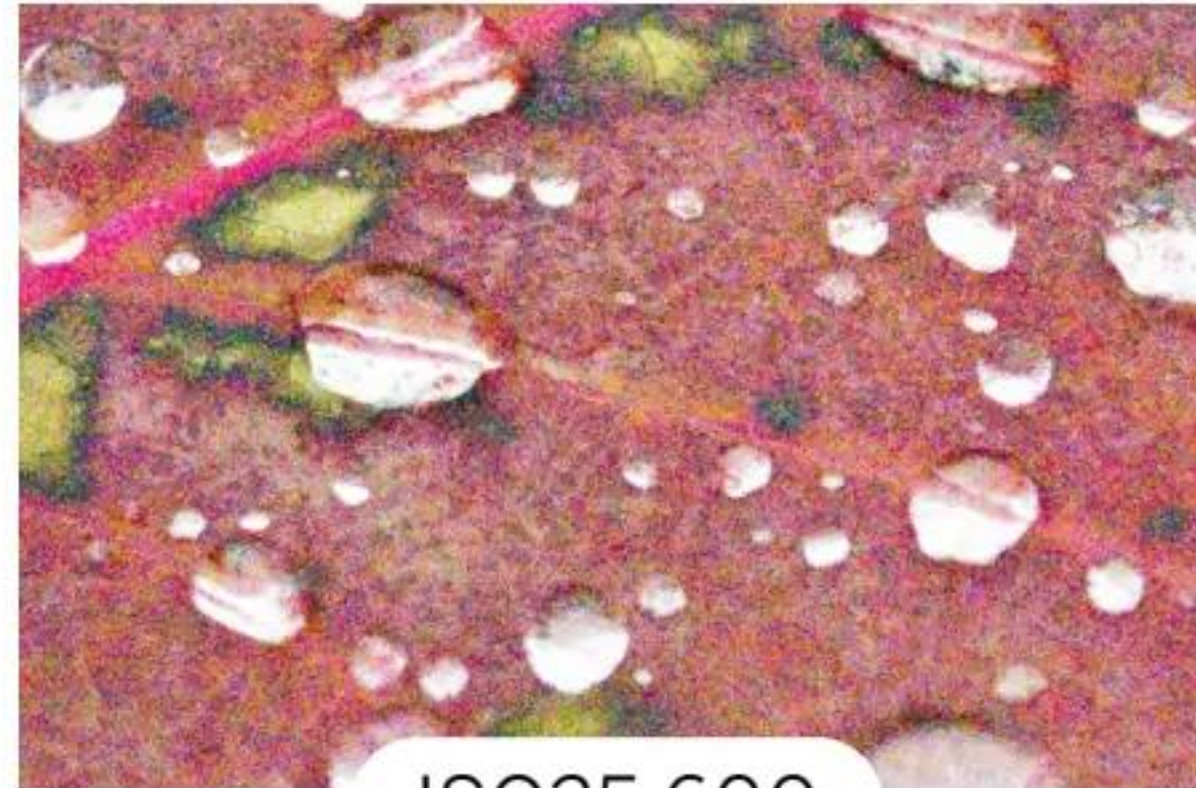
ISO3200



ISO6400



ISO12,800



ISO25,600

6 What's ISO?

ISO controls how sensitive your camera's sensor is to light: lower settings are less sensitive and higher settings are more sensitive. There are a bunch of things to consider with ISO, but the basic logic is that the lower the ISO is (usually 100), the better the image quality is, and vice versa. At low ISOs, there will be very little 'noise' in your

photo. Noise, which becomes more evident at higher ISOs and plain ugly at the highest settings, appears as coloured flecks – a little like film grain. Your choice of setting is ultimately a matter of compromise. The big attraction to using high ISOs (such as ISO6400) is that they allow you to use much faster shutter speeds. This means that, in

low-light settings, you won't have to use a tripod or a flashgun. As a general rule of thumb you can start with ISO100 on bright days; 400 on cloudy days; 800 at dusk and dawn; 1600 indoors without flash; and 3200 or 6400 at night. It's worth running a few tests with your EOS to assess what you consider the highest acceptable ISO.



Raw image files offer the best image quality, but you have to edit them later to bring that out

7 Image file formats

By default your new camera will most likely be set to take JPEGs. This type of image file is processed in-camera, which means that you can download images from the memory card and print them or share them online instantly. The great thing about JPEGs is that they don't take up much space on your memory card and hard drive, and they're processed ready for use. The downside is that they capture a relatively limited range of tone and colour, and their quality deteriorates if you edit them frequently.



Take control over how JPEGs look by selecting a picture style and customising it

When you become more experienced, and more demanding, shooting in the 'Raw' file format will appeal. Each Raw file is considerably larger than a JPEG in terms of storage space. The advantage of Raw is that you control how images are processed, and have more room to correct exposure and white balance mistakes than with JPEGs. The obvious negative is that you have to process all images before they can be printed or shared online, using Photoshop or Lightroom, for example.

Roddy Llewellyn

ONE SHOT AF

8 Focusing modes

To ensure a sharp subject, no matter what you're shooting, Canon cameras offer three autofocus modes that are best used in specific situations. Single Shot AF locks focus as soon as autofocus is achieved, and is best for static subjects, such as portraits. AI Servo AF continually focuses on a moving subject while the shutter button is pressed halfway and the active (red) focus point is over them. AI Focus AF is a hybrid mode that switches from One Shot AF to AI Servo AF if a still subject starts to move, but can be a bit hit-and-miss and many photographers prefer to avoid using it altogether. Manual focus is just that: you have to focus by rotating the focus ring on the lens until the subject looks sharp through the viewfinder or on the LCD screen. This option is best for landscape and macro photography.



MANUAL FOCUS

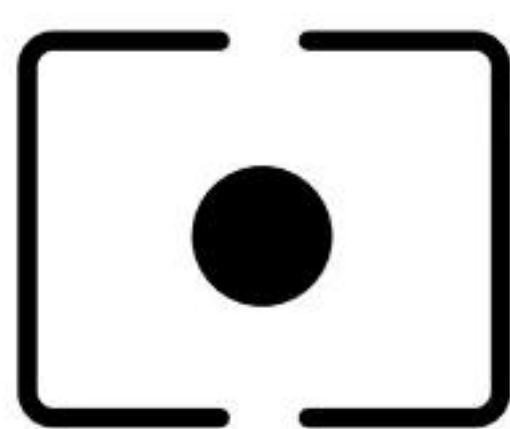


AI SERVO AF

Shutterstock / Maxim Petrichuk

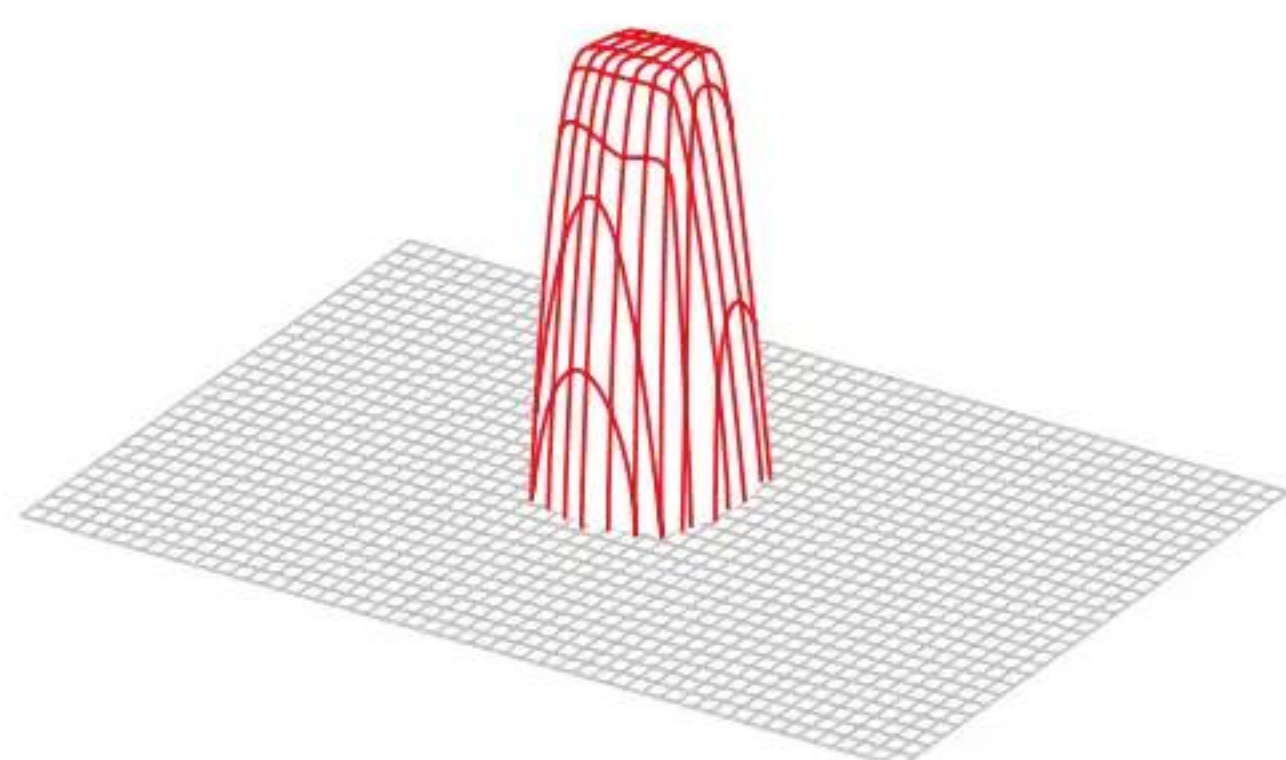
9 Metering modes

Metering modes allow you to change the way your camera reads light from scenes, which then has an effect on how the exposure is set. For most of your shooting, Evaluative will be the best option, but when should you use the other modes?

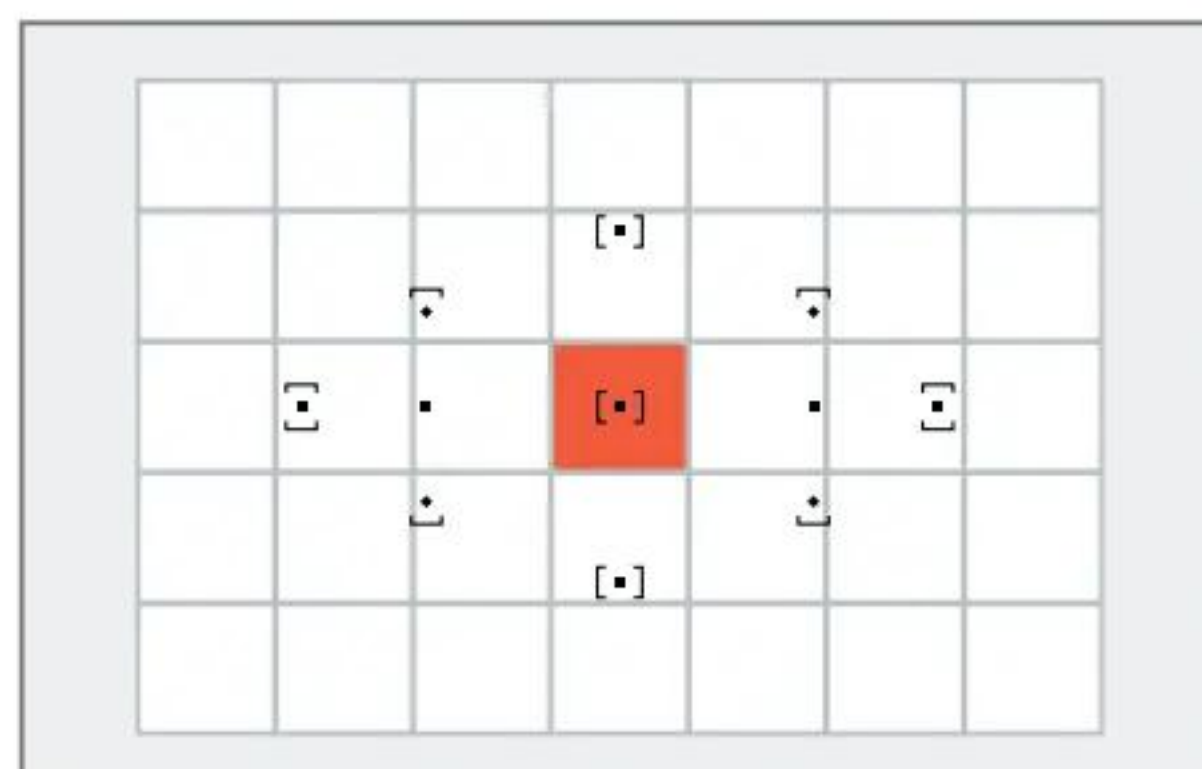


Spot/Partial

Spot metering takes a light reading from an area of roughly 2-4% of the frame, while Partial reads a larger (and more forgiving) area of around 10%. Spot or Partial metering is great when a subject is lit from behind, or when you want to expose for a specific part of the subject.



This graph shows how spot metering concentrates around the focus point



The small area around the focus point gives an indication of the region covered by spot metering

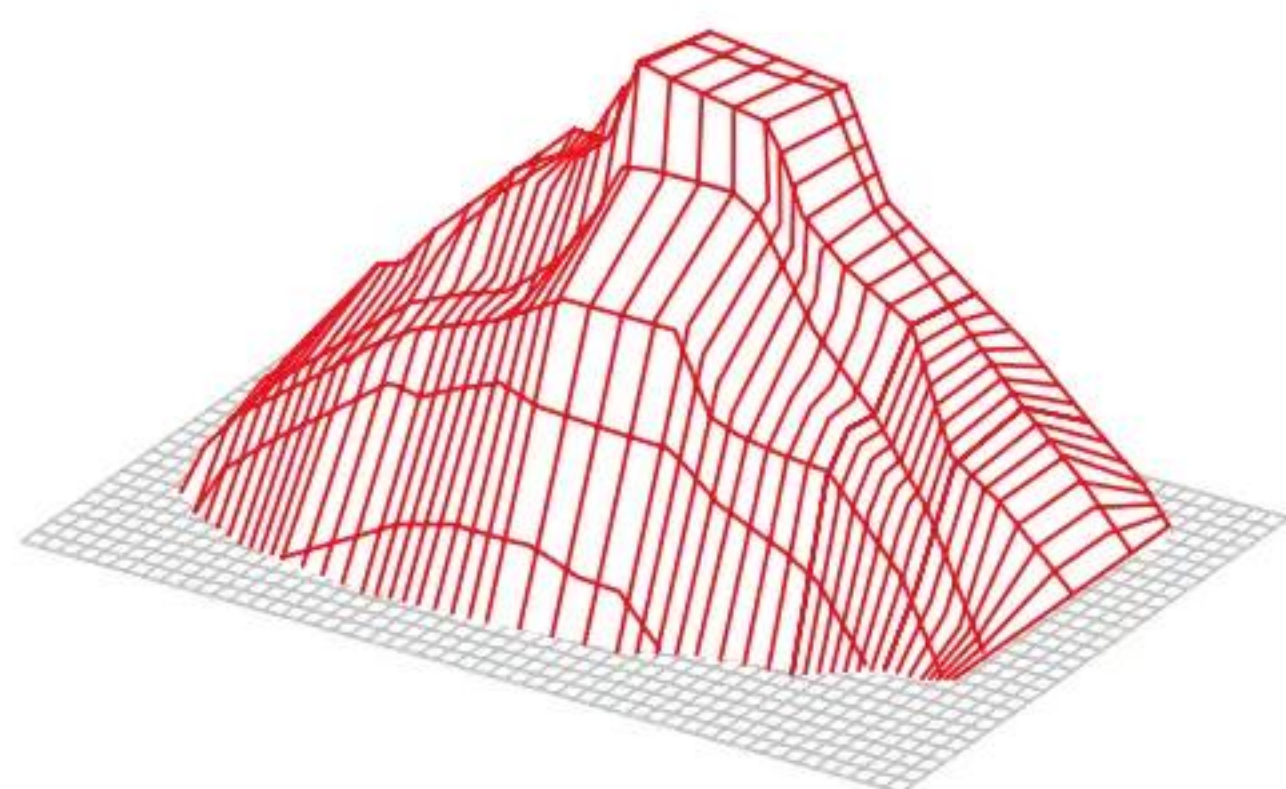


Spot metering is ideal for small subjects against a light or dark tone

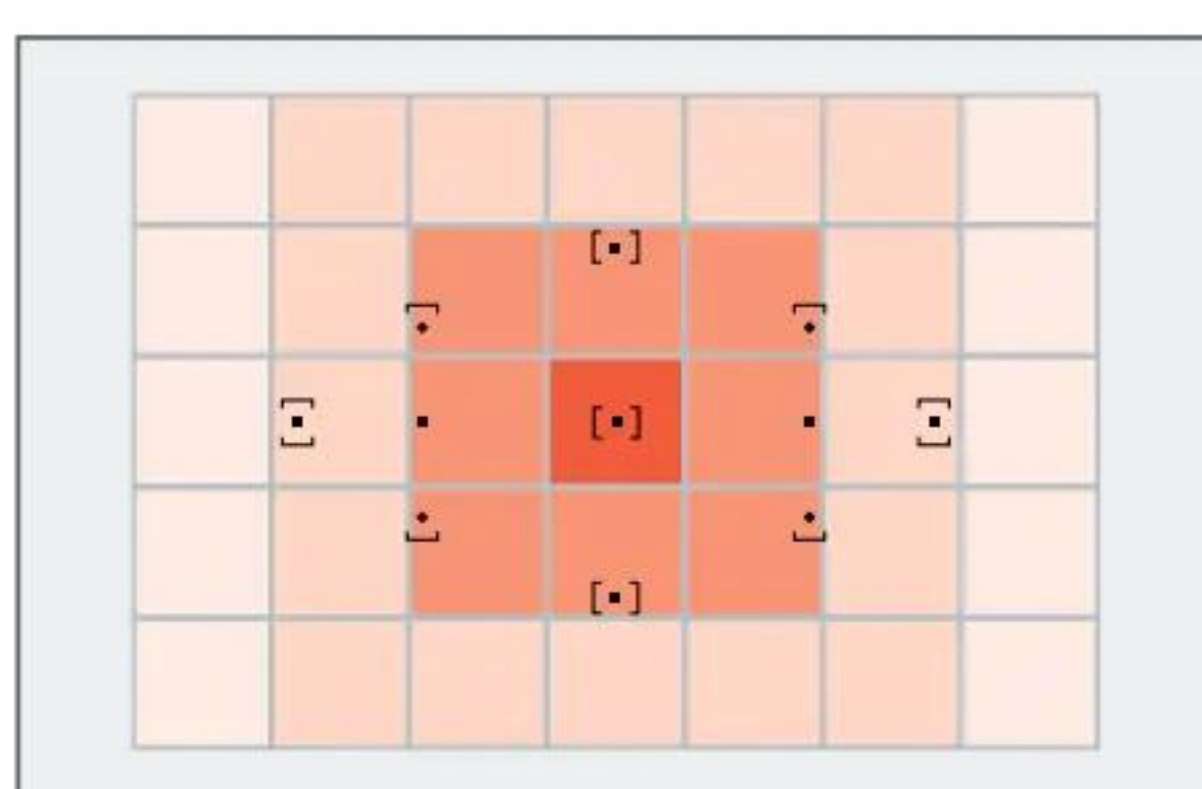


Centre-weighted

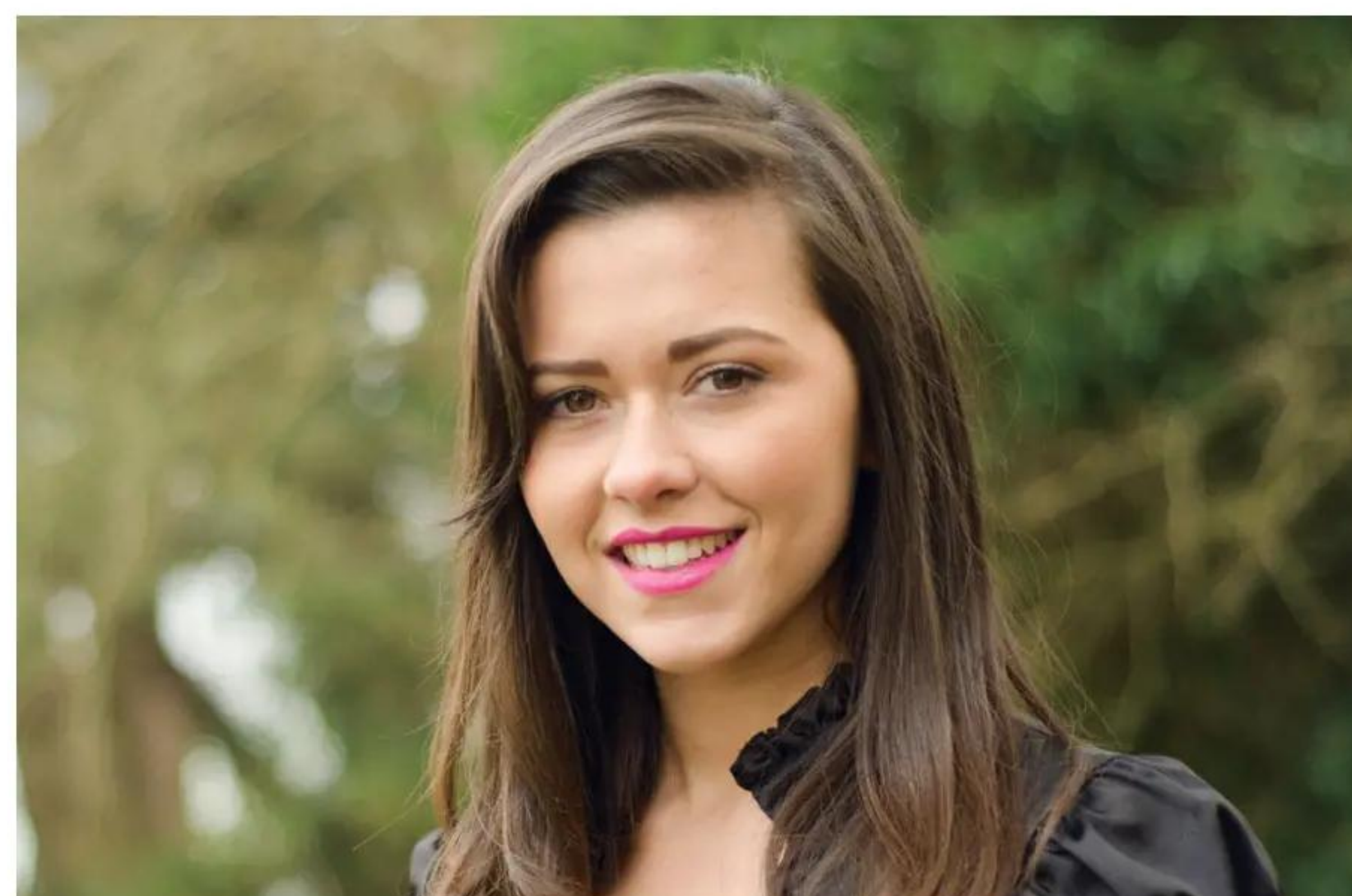
Centre-weighted metering biases metering towards the centre of the frame, graduating out to a lesser effect towards the edges. This mode is useful when using lens filters such as ND grads, which can cause Evaluative metering to overexpose.



This graph is higher in the middle, where it's heavily 'weighted' in its exposure reading



The exposure is mainly on the central part of the image, though the outer parts have an influence

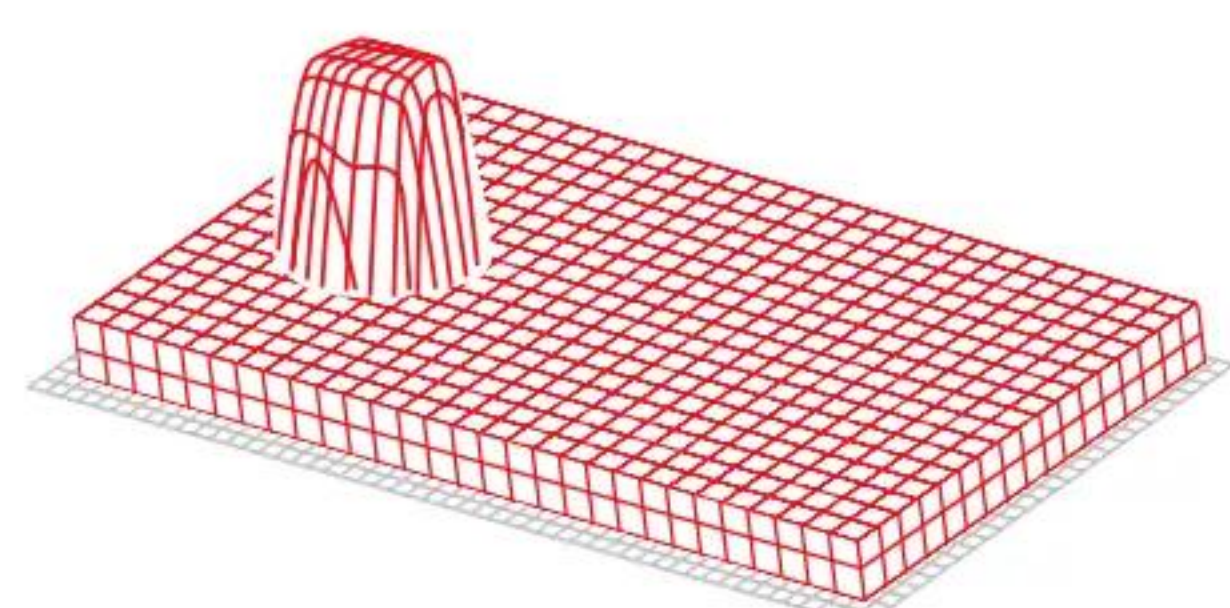


Centre-weighted metering often exposes skin tones perfectly

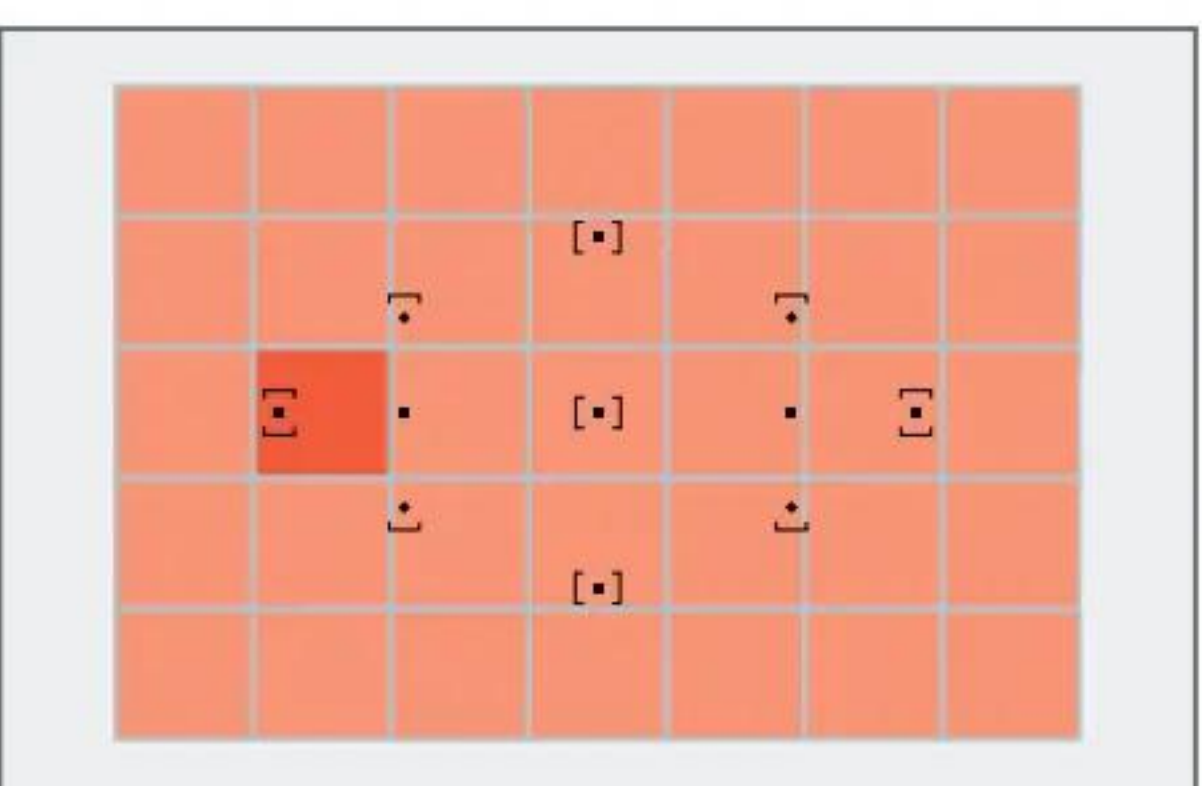


Evaluative

This 'intelligent' metering mode reads light from all parts of the frame, and calculates an average exposure based on the presence of light and dark areas in the scene, with a bias towards the selected AF point(s), helping you to achieve a correct exposure in most situations.



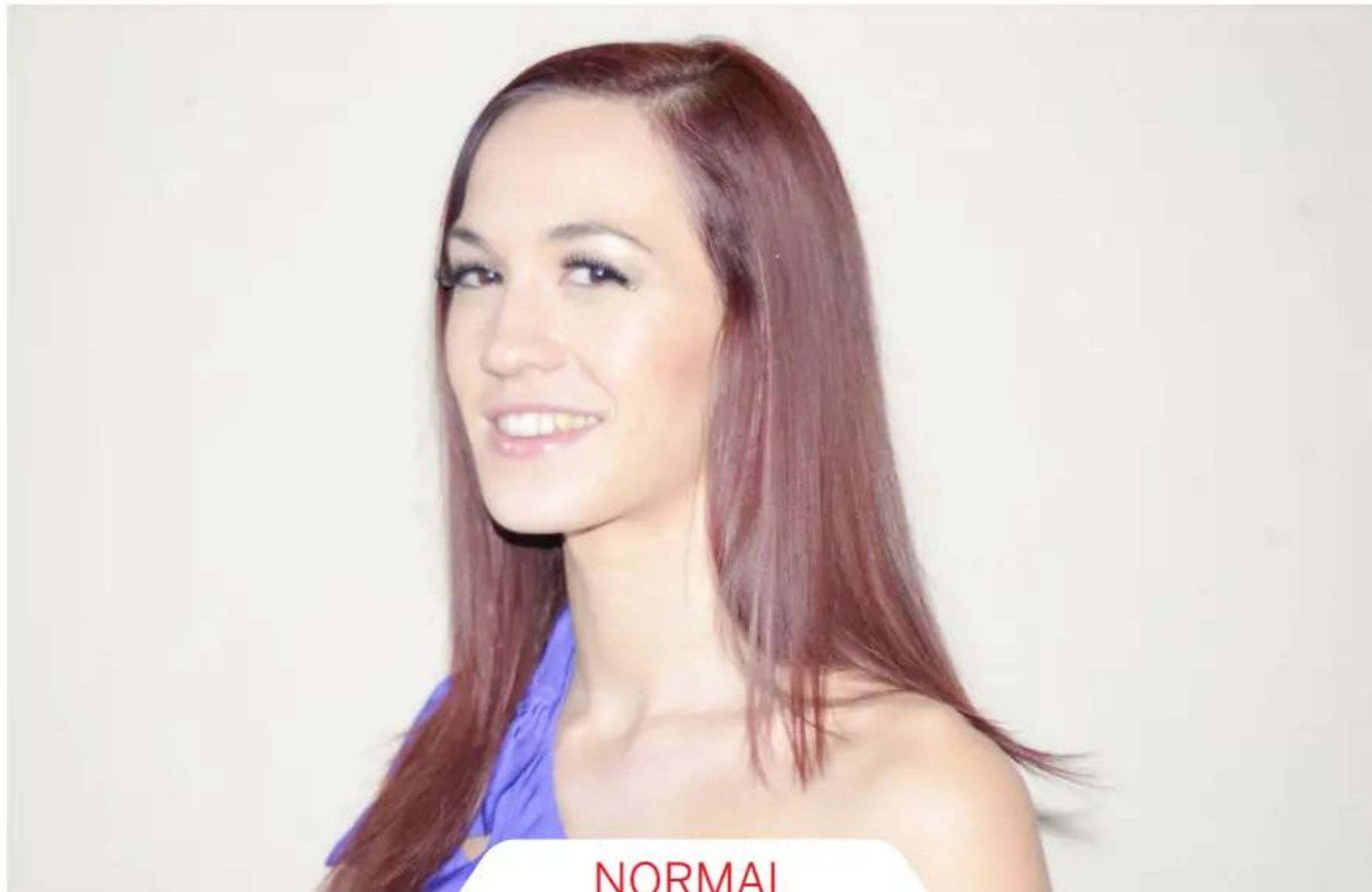
In Evaluative metering, all areas are treated equally with a bias towards the selected AF point



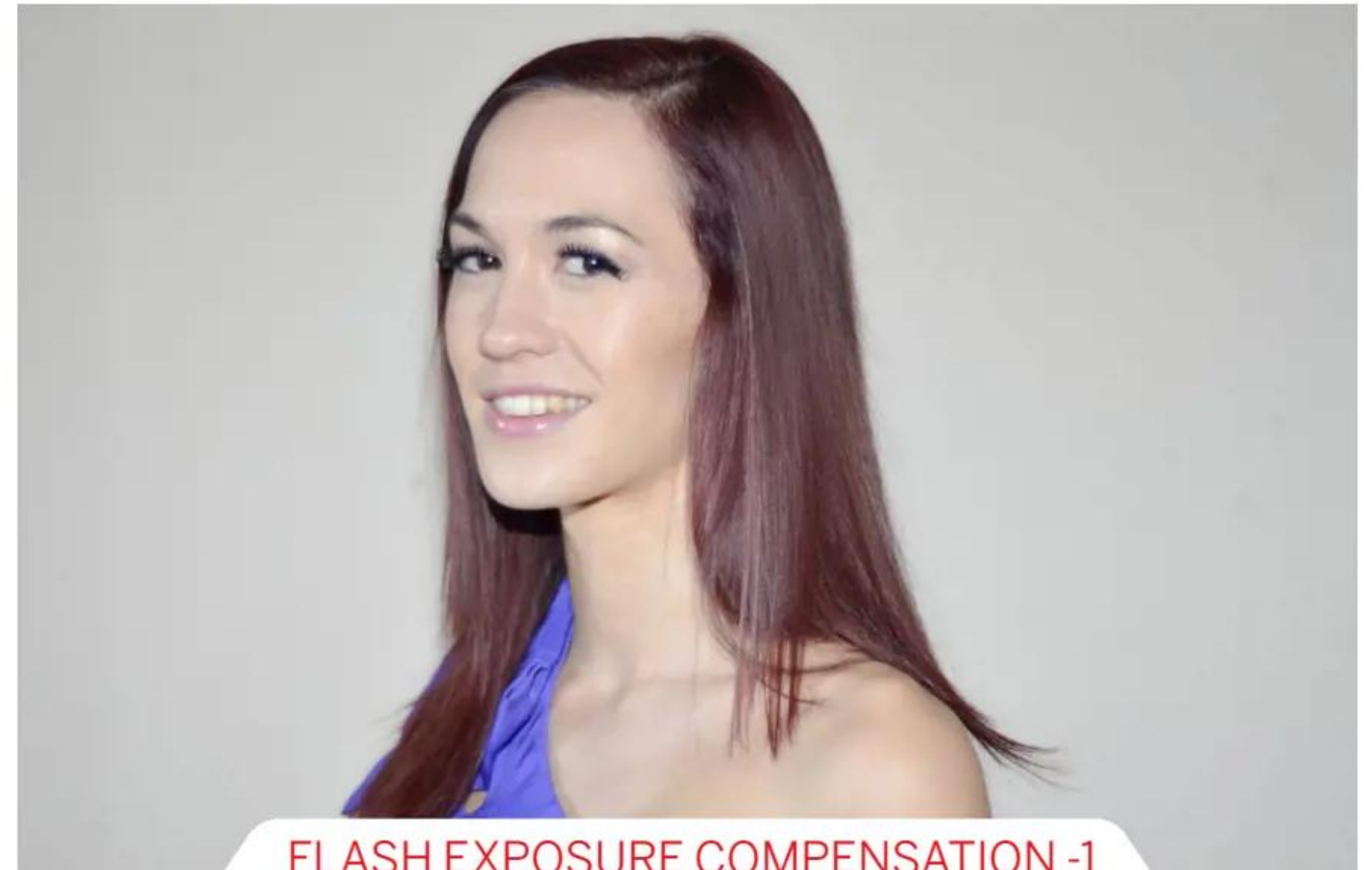
The light across the entire frame is analysed for the camera to determine the type of scene



Evaluative metering is good for shots with a mix of light and dark



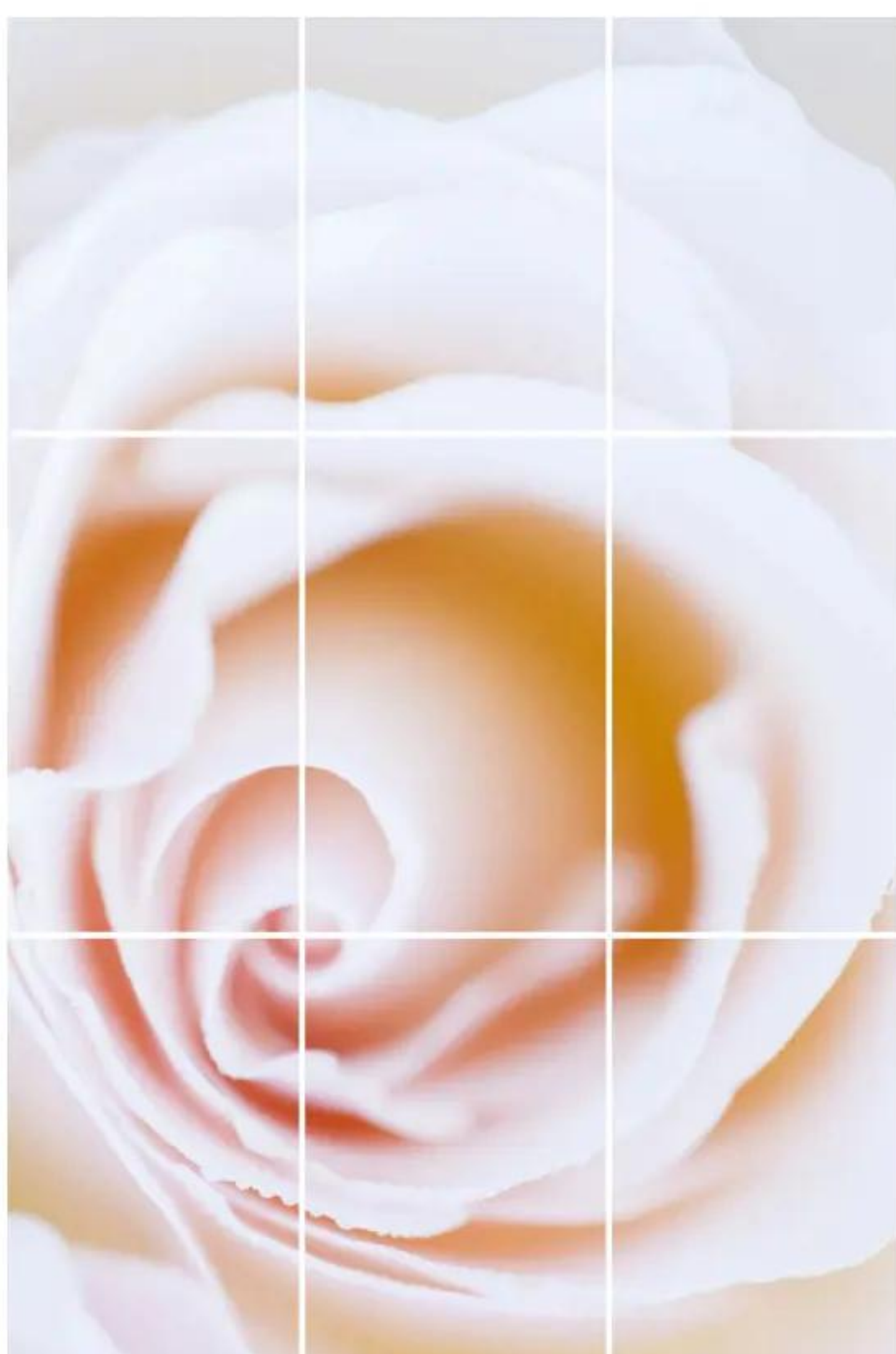
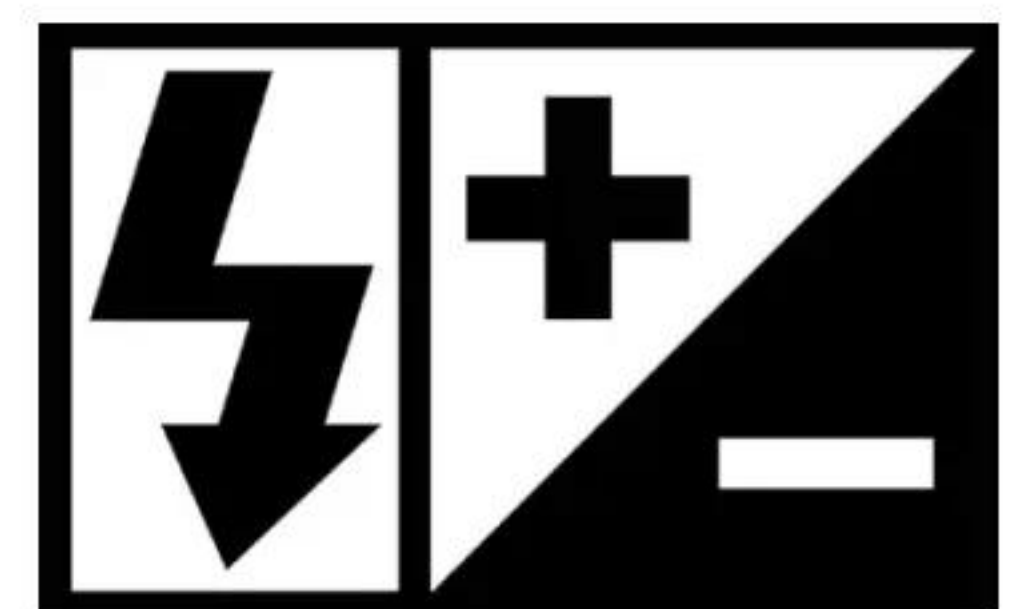
NORMAL



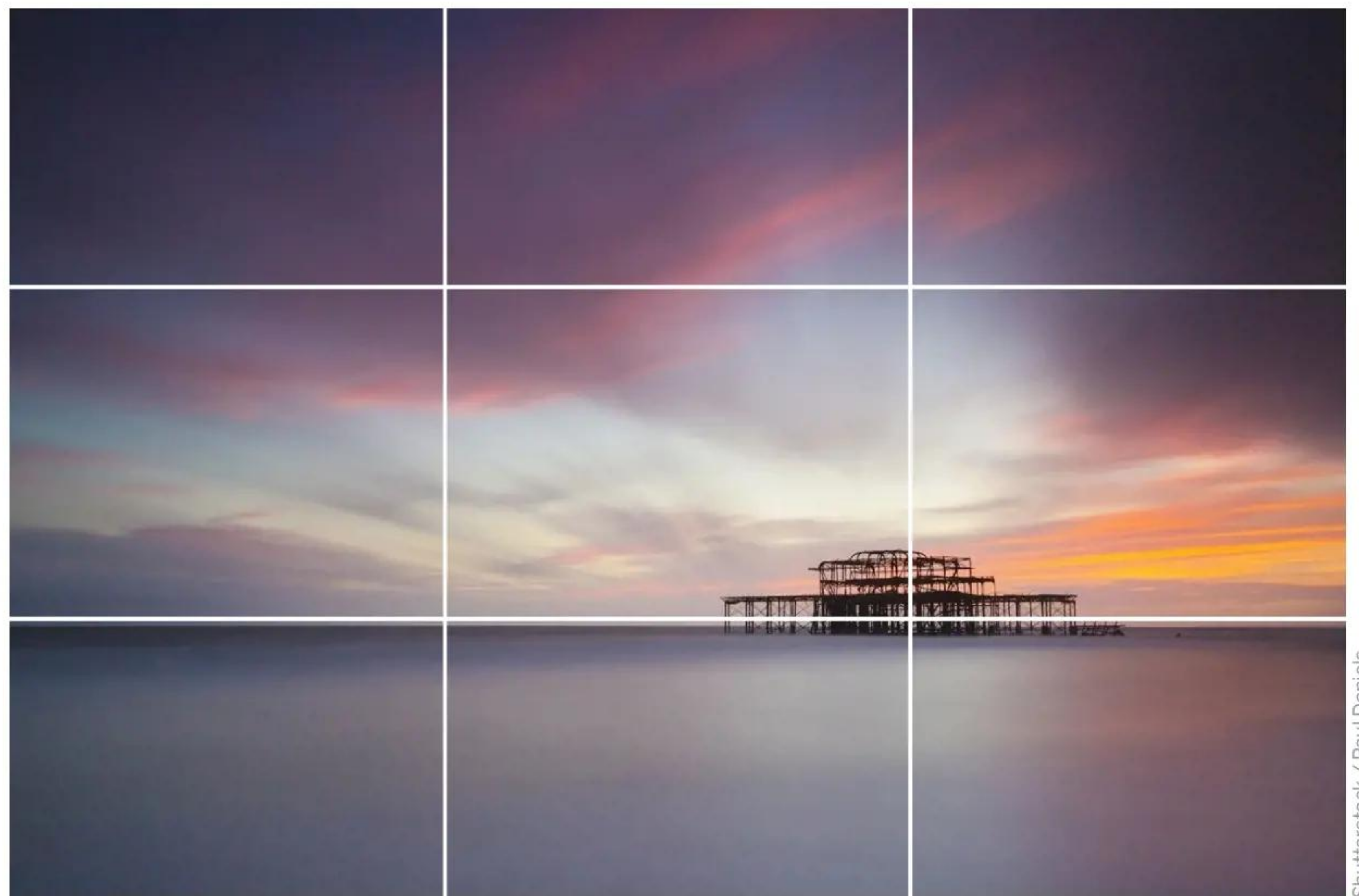
FLASH EXPOSURE COMPENSATION -1

10 Pop-up flash basics

You can't beat a flashgun for versatility, but if your camera has a pop-up flash it can be a great way to add light to subjects. Using a pop-up flash can be as simple as pressing the flash button and shooting, but if you find the flash is too strong or too weak, you can use flash exposure compensation to adjust the power. This may be accessed in the main menu or via the Quick menu. If using a flashgun, you can also set flash exposure compensation via controls on the flashgun itself.



Even with an abstract image, the rule of thirds guideline can provide visual balance



Here, composing the subject on one of the four 'power points' makes the image successful. For this scene the sky is more interesting than the sea, which is why it's more prominent

11 Composition

Composition is simply the way elements in your shot are arranged. With a good composition, elements feel balanced and the viewer is drawn into the frame.

The rule of thirds is one of the simplest compositional techniques to master, but also

one of the most useful. By following this guideline, you can ensure that your photos are visually balanced with all the elements within a scene working together in harmony.

Simply imagine the frame is split into nine equally sized rectangles by two horizontal

and two vertical lines. Canon cameras offer this as a grid overlay on the LCD screen, and some also have one that can be activated in the viewfinder. Position the subject on one of the four points where these lines intersect for a good, solid composition.



18mm



55mm



100mm



200mm

12 Focal length

It's common to buy cameras in kits where you get a basic zoom lens with the camera body. This lens covers the focal lengths that are most useful for a wide range of subjects, and often ranges from 18-55mm. Focal

length is basically how wide the field of view is; a smaller number provides a wider view while a larger number offers a narrower view. This makes 18mm ideal for landscapes and 35mm good for a range of subjects, while

55mm is great for portraits and getting a little closer to subjects that are further away. Focal length also affects depth of field. See in the above images how background sharpness decreases as the focal length increases.



Av

f16

ISO 100

13 Settings for landscapes

If possible, attach your camera to a tripod and shoot after sunrise or before sunset for the best light. Set your camera to Aperture Priority (Av) mode, with the aperture set to f/16 and ISO at 100. Make sure the lens is set to 18mm for the widest possible view, then switch the lens to manual focus. Now turn on Live View (the LCD screen) and compose the image before zooming in to a point that's roughly one-third of the distance into the scene, and manually focus. For a sharp shot, activate the self-timer, then press the shutter button.



Av

f5.6

ISO 100

14 Settings for portraits

Find a location where there's a fairly clean background a few metres behind the subject. To shoot a portrait, set your camera to Aperture Priority (Av) mode with the aperture set to f/5.6, and ISO at 100 or 400 depending on how bright it is. Now rotate the zoom ring so the lens is set to 55mm. Next, set the focus mode to Single Shot and make sure just a single AF point is active; then, looking through the viewfinder, adjust the AF point's position so it's over the subject's eye. You're now ready to begin shooting.



Tv

ISO 100

1/10

15 Settings for panning shots

You'll need to set the lens to 35mm or 55mm, depending on your distance from the subject. Set the camera to Shutter Priority (Tv) mode and use one of the shutter speeds on the right. Set ISO to 100 or 400, depending on the light, then select Continuous AF with the central focus point active. As the subject approaches, track them by half-pressing the shutter button; as they pass, keep tracking them by twisting on your hips before releasing the shutter and smoothly continuing to track them.

Suggested shutter speeds for panning

Walking: 1/8 to 1/15 sec

Running: 1/15 to 1/30 sec

Cycling: 1/15 to 1/60 sec

Cars: 1/30 to 1/125 sec

Racing cars: 1/125 to 1/250 sec



GET TO GRIPS WITH LENSES

How to shoot with any lens, from wide-angle and telephoto zooms to macro, prime and fisheye...

Lenses. We all own one in some shape or form, and tend to take them for granted. But are you sure you're getting the most from that pricey bit of glass stuck on the end of your Canon camera? What lens you pick to shoot a subject, and how you use it, has a big influence on the quality of your photographs. For example, the focal length affects how much of the scene you can include, which in turn will influence the viewpoint and composition. The apertures available on your lens will affect the depth of field, and will also determine the available shutter speeds.

Certain lenses lend themselves to certain subjects. A wide-angle lens is the natural choice for landscapes, while for sports and action you'll

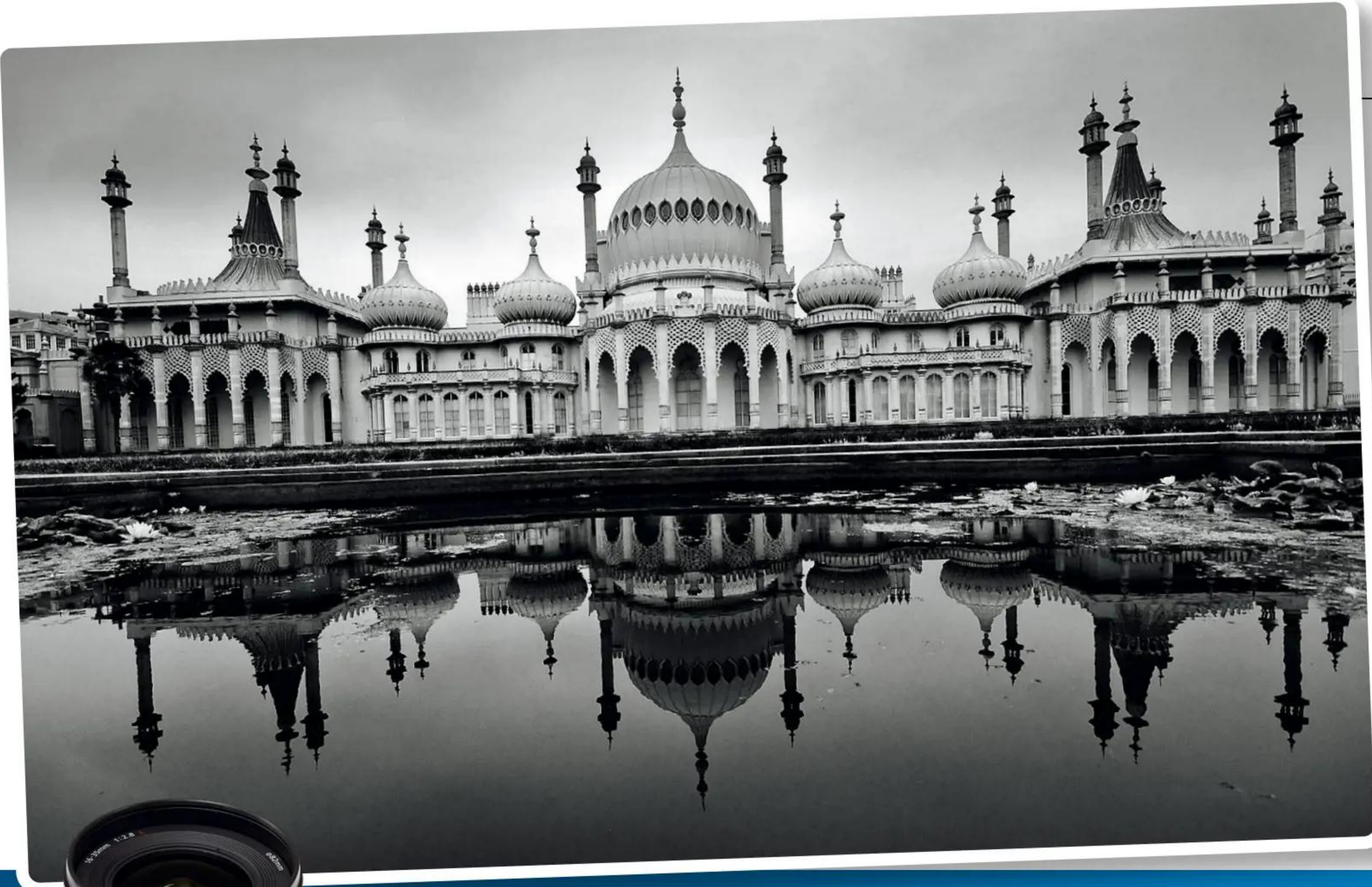
almost automatically reach for a telephoto. But lens choice isn't always this obvious. By understanding how each lens affects your images, you can think a little more laterally, and get even more eye-catching results by using a lens that you wouldn't normally use for a particular subject.

To discover the effect of different types of lens on your images, the subjects you shoot, and even the way you look at the scene in front of you, we've provided a straightforward guide to the main types of lenses: from 10-20mm wide-angles, 50mm primes and 70-300mm telephoto zooms to 8mm fisheye and 100mm

macro lenses. And whether you use Canon, Sigma or Tamron lenses on your Canon EOS camera, our tips will be relevant to you. So read on how to discover everything you need to know about your collection of lenses, and how to get the most from them. We'll also help you overcome some of the most common Canon-fit lens problems! ►

Using different types of lenses on your Canon provides you with the opportunity to capture scenes in original ways





Grand or old architecture is a classic subject for wide-angle zoom lenses



Wide-angle lenses

Shooting with wide-angle lenses doesn't just enable you to include more of the landscape – it also exaggerates the perspective

The widest setting on most standard kit zooms (eg EF-S 18-55mm) offers a reasonable wide-angle option, but how can a 10-20mm ultra wide-angle lens affect your pictures? At its simplest, a really wide-angle lens enables you to include more of the scene in your image. But using a wide-angle lens successfully isn't just about including the whole scene. Shooting at the widest focal length, for instance, can easily make everything in the scene appear tiny in shot, so you need to use a few compositional tricks to maximise the impact of your images. To make your wide-angle shots really stand out, you need to get in close to exaggerate the perspective. Look for

foreground interest or leading lines to give your images a three-dimensional feel, or your wide-angle shots can look rather empty.

Converging verticals

Getting the whole subject in while keeping it a reasonable size in the frame can lead to a common problem, especially with building and architecture shots: when you angle the camera up slightly to get the best composition, the vertical lines in the subject end up pointing inwards, making it look like the subject is falling over. The only way to avoid this with a wide-angle lens is to make sure the back of the camera is parallel to the subject and try to make the

most of the composition from this position. Try shooting with the camera very low to the ground to include plenty of foreground if it's interesting enough. Otherwise, you'll have to crop the image afterwards to remove the featureless foreground.

CAMERA TILTED UPWARDS



CAMERA LEVEL



When shooting buildings keep the camera back parallel to the subject to keep the vertical lines straight

FOCAL LENGTH AND SENSOR SIZE

Your camera sensor has a huge effect on the field of view. Canon DSLRs like the 750D/T6i, 80D or 7D Mk II have a smaller 'APS-C' sized sensor, which has a magnifying effect (or crop factor) on

lenses of 1.6x. For instance, a 50mm lens on an APS-C sensor has the same field of view as a 80mm lens on a full-frame sensor. Here's a rundown of which lenses you need to get different effects.

EOS DSLR	Wide-angle	Standard zoom	Telephoto
APS-C	10-16mm	18-55mm	Above 70mm
Full frame	14-24mm	28-70mm	Above 85mm

SUPER TIP!

WATCH OUT FOR DISTORTION

It may be tempting to use an extreme wide-angle lens to shoot groups of people, especially if space is limited. But go too wide and you can end up with loads of unflattering distortion, making the people close to the camera appear much larger than those in the background.

“Look for foreground interest or leading lines to give your images a three-dimensional feel”

GET THE SHARPEST RESULTS

It's tempting to think that, to ensure sharp images, you simply set the lens to the narrowest aperture (eg f/22) and shoot away, but this isn't the best approach. There are loads of factors that can affect the sharpness of your images, such as the

quality of the lens or the presence of camera shake, but the aperture you choose is the easiest one to control on location. Shooting at the widest aperture will usually give you reasonable sharpness in the middle of the frame, but the edges will often be much

softer. Shooting at the narrowest aperture will give you better depth of field, but the sharpness across the image can suffer because of diffraction. Most lenses have a 'sweet spot' that will give you sharp results across the image, usually around f/8-f/11.

f/4



f/11



f/22





Prime lenses

Swap the convenience of a zoom for the speed and quality of a prime lens to really improve your shots

Fixed focal-length lenses (primes) may seem a bit like dinosaurs in these days of image-stabilised zoom lenses and the high-ISO capabilities of the latest Canon DSLRs, but they still have a place in your camera bag. There are plenty of prime lenses to choose from. The prices of extremely fast wide-angle and telephoto optics are verging on lottery-win territory, but there are more reasonable options around such as the Canon EF 50mm f/1.8 that is available for around £100/\$100. The main advantage of a prime lens over the common zoom

“The main advantage of a prime lens over a zoom is the wider maximum aperture”

is the wider maximum aperture (eg f/1.8 compared to f/3.5), which enables you to achieve faster shutter speeds for shooting in lower light levels at the same ISO without risking camera shake. These wider apertures are also ideal for capturing a shallow depth of field.

Explore your viewpoint

Zoom lenses are very convenient, but this convenience is not without its drawbacks. A zoom lens can make you lazy when it comes to choosing your viewpoint, as you simply zoom in or out. With a prime lens, the only way of altering the framing or size of the subject is to physically move, which can result in striking compositions.

EXPLORE DEPTH OF FIELD

Even the best quality prime lenses don't give their sharpest results at the maximum aperture, but the limited depth of field helps to make the sharp areas really stand out. You'll also find that the lack of sharpness is mostly confined to the edges of the image, so keep your main point of focus within the central area.

f/1.8



f/22



The range of apertures on prime lenses makes them perfect for experimenting with depth-of-field effects



Prime lenses are perfect for exploring different viewpoints. They can produce striking images of relatively familiar subjects, such as flowers or car bonnets

SUPER TIP!

**ALWAYS FOCUS
ON THE EYES**

Working with a shallow depth of field makes focusing accurately very difficult. When shooting portraits, for example, you normally want to make sure that the eyes are sharp, so use a single AF point and ensure the focus point is positioned over the eyes (or closest eye) of your subject.

SUPER TIP!**COMPRESSING PERSPECTIVE**

It's the distance that you shoot from rather than the focal length that causes the 'compressed perspective' effect. If you don't have a long lens you can get the same effect by simply cropping in on an image shot at a shorter focal length from the same distance as you would if shooting with a telephoto.



Telephoto lenses

Extending the reach of your photography with a long lens can help you capture subjects that are beyond the scope of other optics...

A telephoto lens is the natural choice for sports and wildlife subjects that you can't get close to. But long-focal-length lenses are great for shooting all sorts of subjects. Because you can shoot from a distance, it's easier to isolate individual subjects from their surroundings, or make subjects at different distances appear to be very close together in the final image. This effect is called 'compressed perspective', and is dead handy when there are layers of objects in the scene that appear to stack on top of each other. As well as photographing birds and wildlife

and action shots, the longer focal length is also perfect for grabbing candid portraits. But a telephoto lens can also be used creatively for picking out individual details in architecture or landscape scenes.

Image stabilisers

The downside to lenses with longer focal lengths is that they are more prone to camera shake (see right). To combat this, lens manufacturers have developed 'image stabilisation' systems that enable you to get sharp results with slow shutter speeds. Look out for lenses with the following abbreviations: Canon IS

(Image Stabilizer), Sigma OS (Optical Stabilizer), and Tamron VC (Vibration Compensation). With a little practice these systems enable you to shoot with shutter speeds well below those you would normally use when handholding your Canon camera – for instance, a four-stop IS system means instead of a 1/320 sec shutter speed, you can get away with shooting at just 1/20 sec.

“Shoot from a distance and isolate individual subjects from their surroundings”

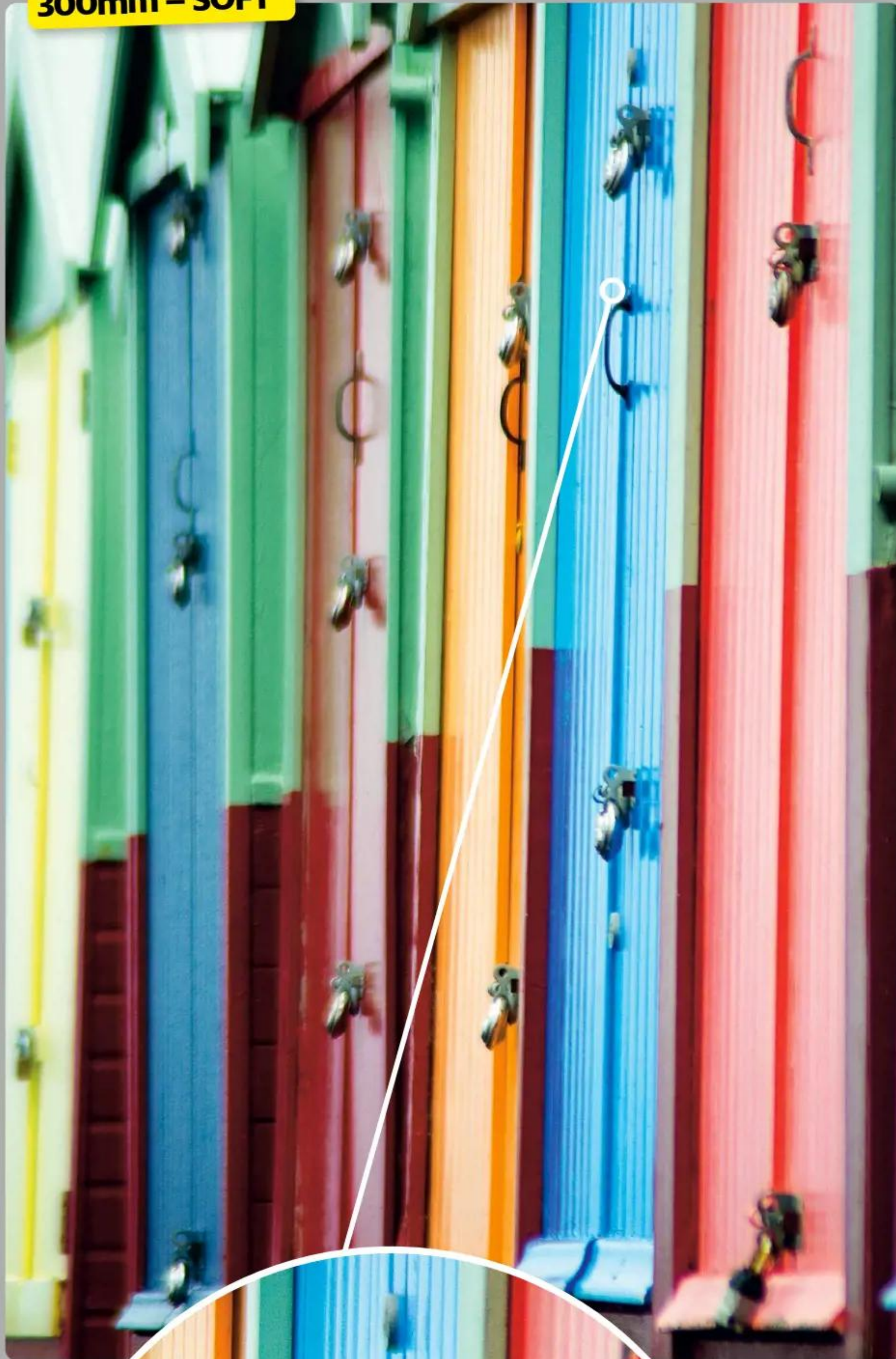
BEAT CAMERA SHAKE

The long focal length of a telephoto lens not only magnifies the subject, but also the movement of the camera and lens. This makes them more prone to blurring than short-focal-length lenses, so you need to take extra care when using them.

The old rule of thumb for shake-free results is to use a shutter speed of 1/the focal length or faster – so if you're shooting at a focal length of 200mm, you should get sharp results at 1/200 sec or faster.

You should use the fastest shutter speed you can by increasing the ISO – eg from 100 to 400, 800, 1600 or 3200. This will help to minimise the effects of camera shake. But this isn't always possible if you need to use a low ISO. The obvious solution would be to use a tripod, but it's not always practical to set one up. In this situation, look out for objects to brace yourself against, such as fences, benches, walls and streetlamps.

“If you're shooting at a focal length of 200mm, you should get sharp results at 1/200 sec or faster”

300mm – SOFT**200mm – SHARP**

Shooting at 1/250 sec with a 70-300mm lens will give you sharp results at 200mm, but at 300mm the image is blurred due to camera shake. See how the handles and padlocks lose sharpness at 300mm?



Fisheye lenses

Embrace the extreme distortion created by fisheye lenses and get really striking results

Like wide-angle lenses, fisheye optics enable you to shoot wide, but the distorted view produced by fisheyes produces much more stylised images. Using a fisheye lens means thinking slightly differently about your shooting technique, because many of the normal rules don't apply. For instance, you need to be much closer to your subject than with a conventional lens. The distorted image also makes it difficult to use many of the compositional techniques that work perfectly well with any other type of lens.

Experiment with different framing techniques. Symmetrical compositions work particularly well, as these shots taken at Brighton seafront illustrate, while portraits can take on a caricature-like quality.

Two fisheye types

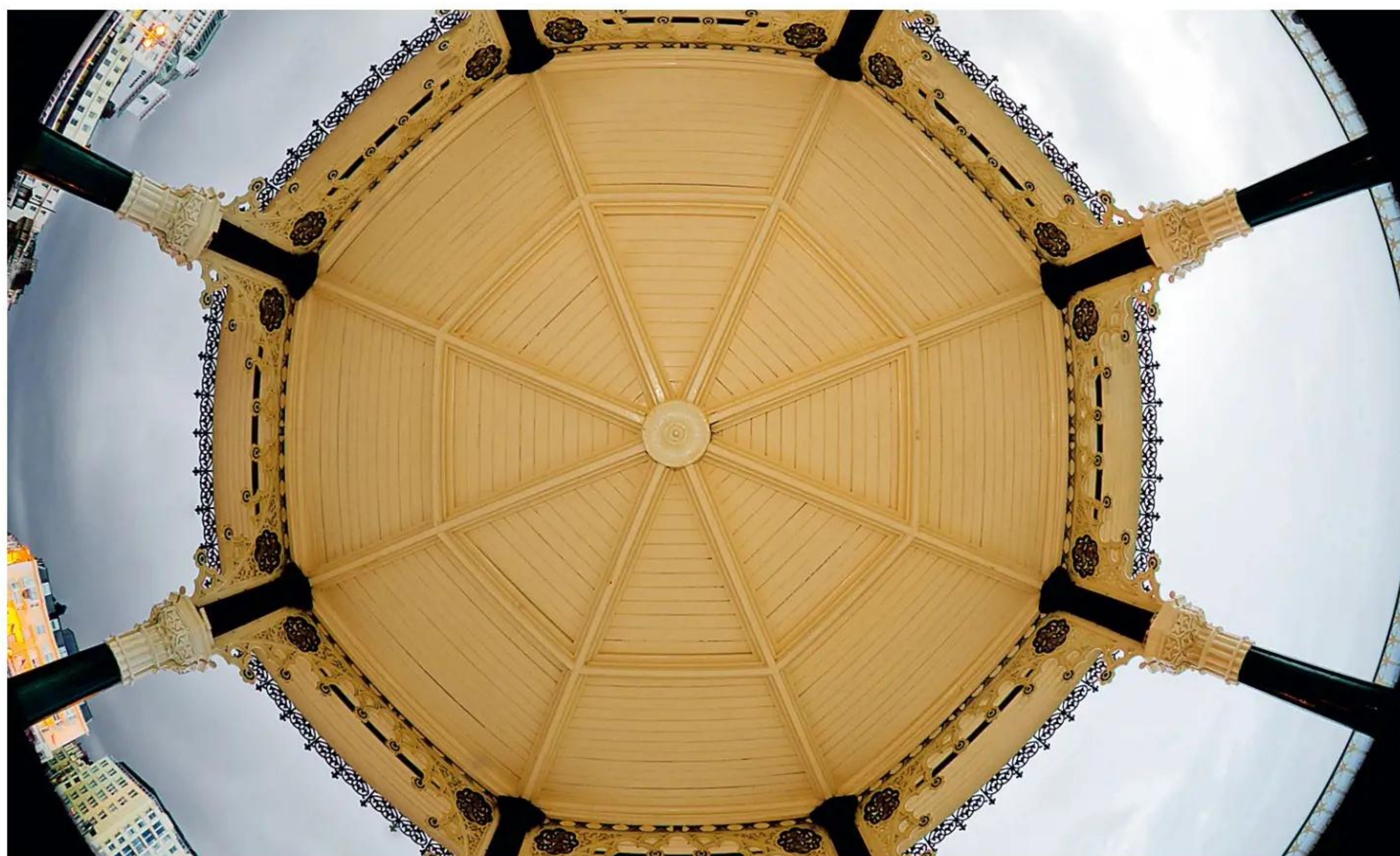
There are two main types of fisheye lens: full-frame and circular. A full-frame fisheye produces an image that covers the entire sensor, while a circular fisheye produces a round image in the middle of the sensor with a dark border around it. This effect varies according to the design of the lens and the size of the sensor in your Canon DSLR. A lens that produces full-frame images on an APS-C sensor (eg 750D/T6i) will look different on a full-frame camera (eg EOS 5D Mk IV), so you need to check the coverage for your camera. For example, the Sigma 8mm lens used for the shots on this page produces fully circular images on a full-framer, and images that are between circular and frame-filling on an APS-C DSLR.

Distorted view

Fisheye lenses are also characterised by their distorted view of the world. With most lenses you try to avoid distortion, but with a fisheye lens, distortion is one of the key features of the image. The distortion can range from lines that appear to bend, to entirely circular images.

When it comes to framing, you need to get in close to your subject, otherwise everything will appear tiny in the final image. This can feel unnatural because you often need to shoot just inches away from the subject. So even if you're used to shooting with wide-angle lenses, the best technique is to step right up to your subject, and really embrace the wacky world of fisheye lenses.

“Using a fisheye lens means thinking slightly differently about your shooting technique”





With a fisheye lens, you'll need to get really close to your subject. For this image, we were three feet away from the beach huts

SUPER TIP!
CHECK THE FRAME EDGES

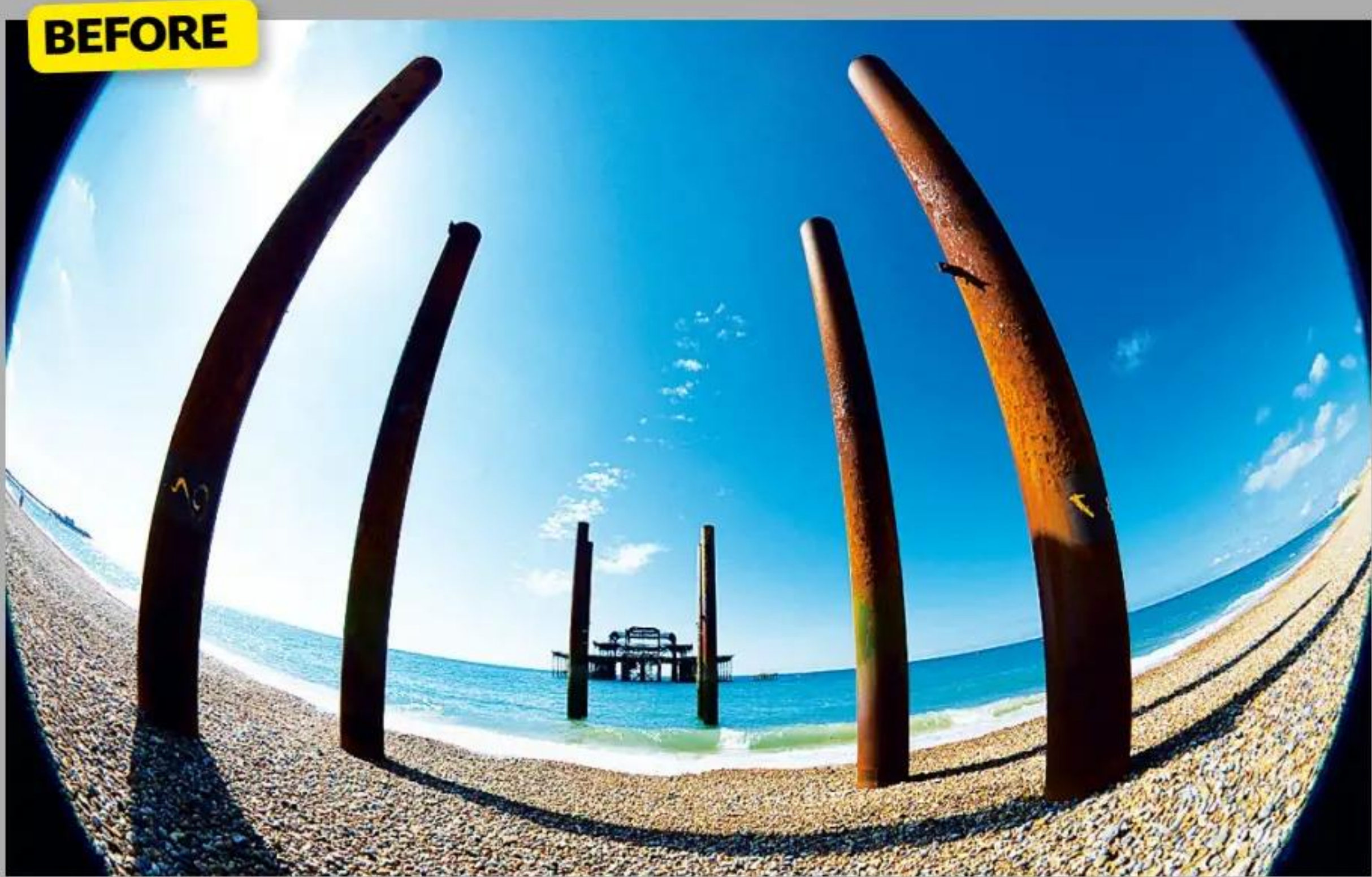
The extremely wide field of view you get with a fisheye lens means that you can end up with your feet, your shadow or your tripod in the bottom of the shot. This usually looks like a mistake on your part, so always take a quick look at the edges of the frame to make sure you aren't in the shot!

GET WELL-BALANCED EXPOSURES

With such an extreme field of view that includes large areas of sky and foreground, and no chance of using ND grad filters, the results from a fisheye lens often suffer from

too much contrast from left to right. The best solution for this is to shoot in Raw format and adjust the exposure in Adobe Camera Raw to ensure that as much highlight and shadow

detail as possible is retained. In extreme conditions you can also try shooting several different exposures and combining them as a composite in Photoshop.



SUPER TIP!**WHEN IS MACRO NOT REALLY MACRO?**

You'll find the word macro added to many zoom lenses, but this doesn't mean that they will give the same results as a 'true' macro lens. The term macro on most zoom lenses means that it may be able to focus a little closer than other similar lenses, not that it will be able to focus on small subjects.



Macro lenses

Explore the close-up potential of macro lenses and you'll find a whole new world in almost any and every location

A macro lens enables you to enter a world that's invisible to the casual observer. Most photographers use them to fill the frame with tiny subjects, but they're much more versatile than simply being a tool for focusing on close-ups. Most Canon-fit macro lenses have a focal length between 50mm to 180mm, as well as a reasonably fast maximum aperture, which is perfect when you want to really blur out the background.

Used at normal distances, you can use a macro lens like you would a prime lens. Most offer a maximum aperture of around $f/2.8$, which will create a shallow depth of field when shooting portraits, for instance. So for normal shooting, simply employ

the same techniques as you would with prime lenses if you want to use the widest apertures. It's at close distances that a macro lens really comes into its own, and the depth of field can be just a few millimetres.

For these subjects, switch to manual focus, and carefully focus on the part of the subject you want to be sharp. If the subject is static, put your Canon camera on a tripod to be even more precise with your focusing. If you find it difficult to focus accurately through the viewfinder, try using Live View mode and zoom in to check the focus.

Working distance

We used a 50mm macro lens for our shot of the shell above, but you can

buy a macro lenses with a focal length of 60mm, 90mm, 100mm or 180mm. The main difference in using these lenses is the distance between you and the subject at the same magnification. These distances may not sound important, but just like using normal lenses, it can alter your perspective slightly. More importantly, it can also make a huge difference to your ability to shoot subjects such as insects, which you may not be able to get close to without scaring them off.

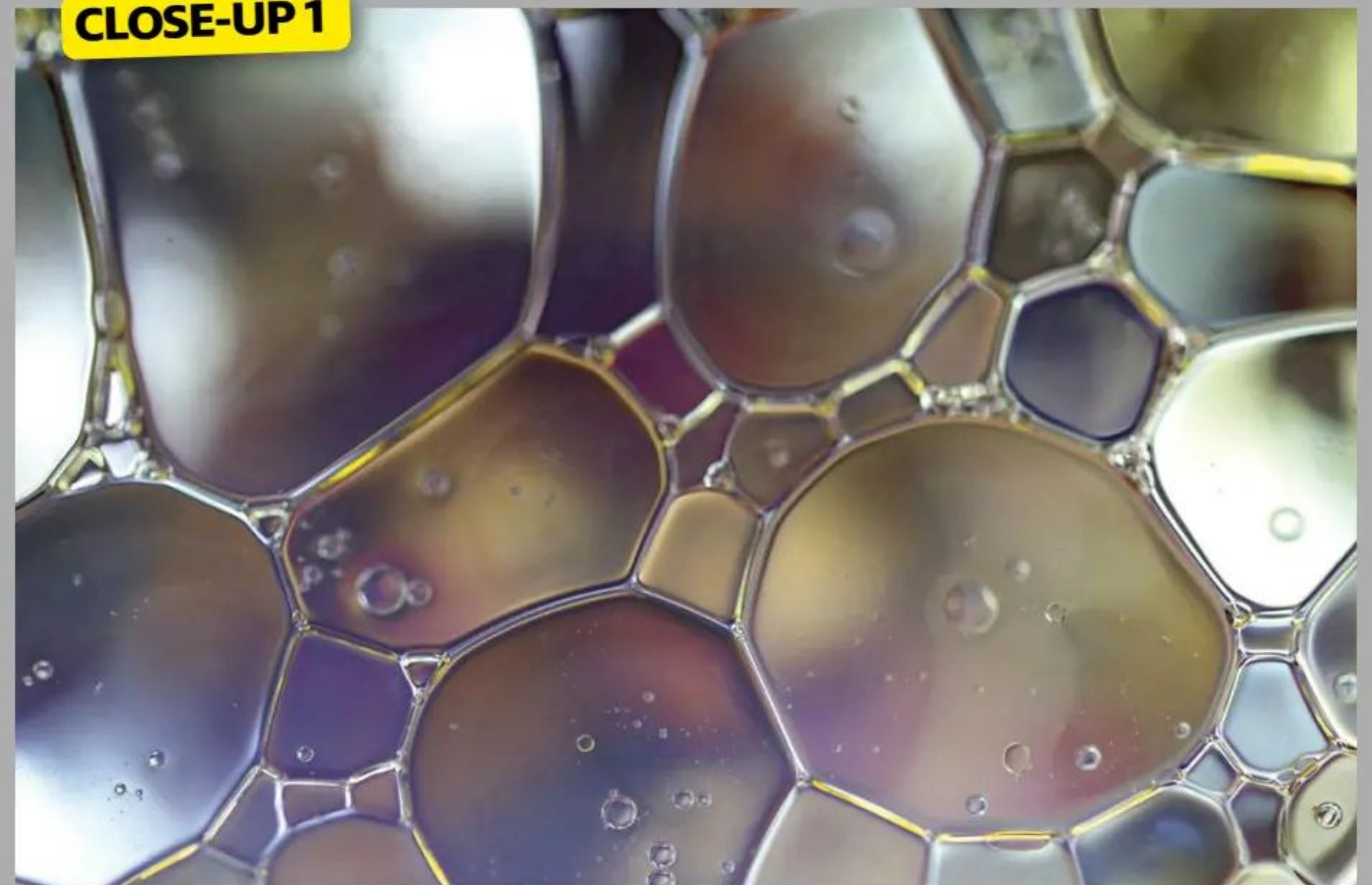
“At close distances with a macro lens, the depth of field can be just a few millimetres”

CLOSE-UP CREATIVE POINT OF VIEW

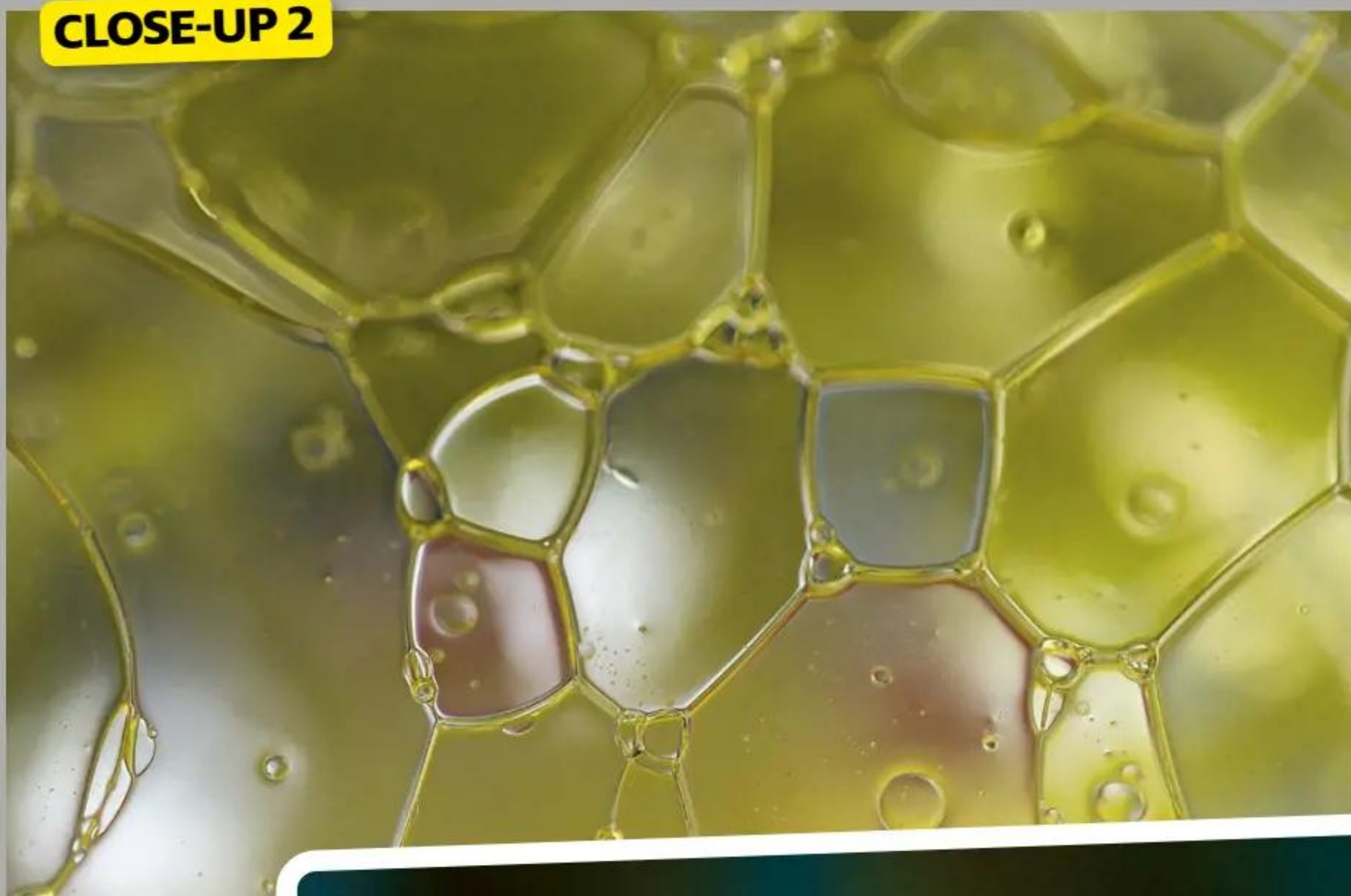
The great bonus of using macro lenses on your Canon EOS camera is that they enable you to capture creative shots of the most mundane things. By simply being able to focus very closely you can shoot everyday objects in new and exciting ways and end up with cool, abstract images – as our close-up examples show. Believe

it or not, these shots are simply of water in a glass, with olive oil on the surface to create the bubbles, and by using different coloured paper under the glass, you can quickly change the colour of each image. Try shooting a series of three similar images then printing and combining them together for an artistic 'triptych'.

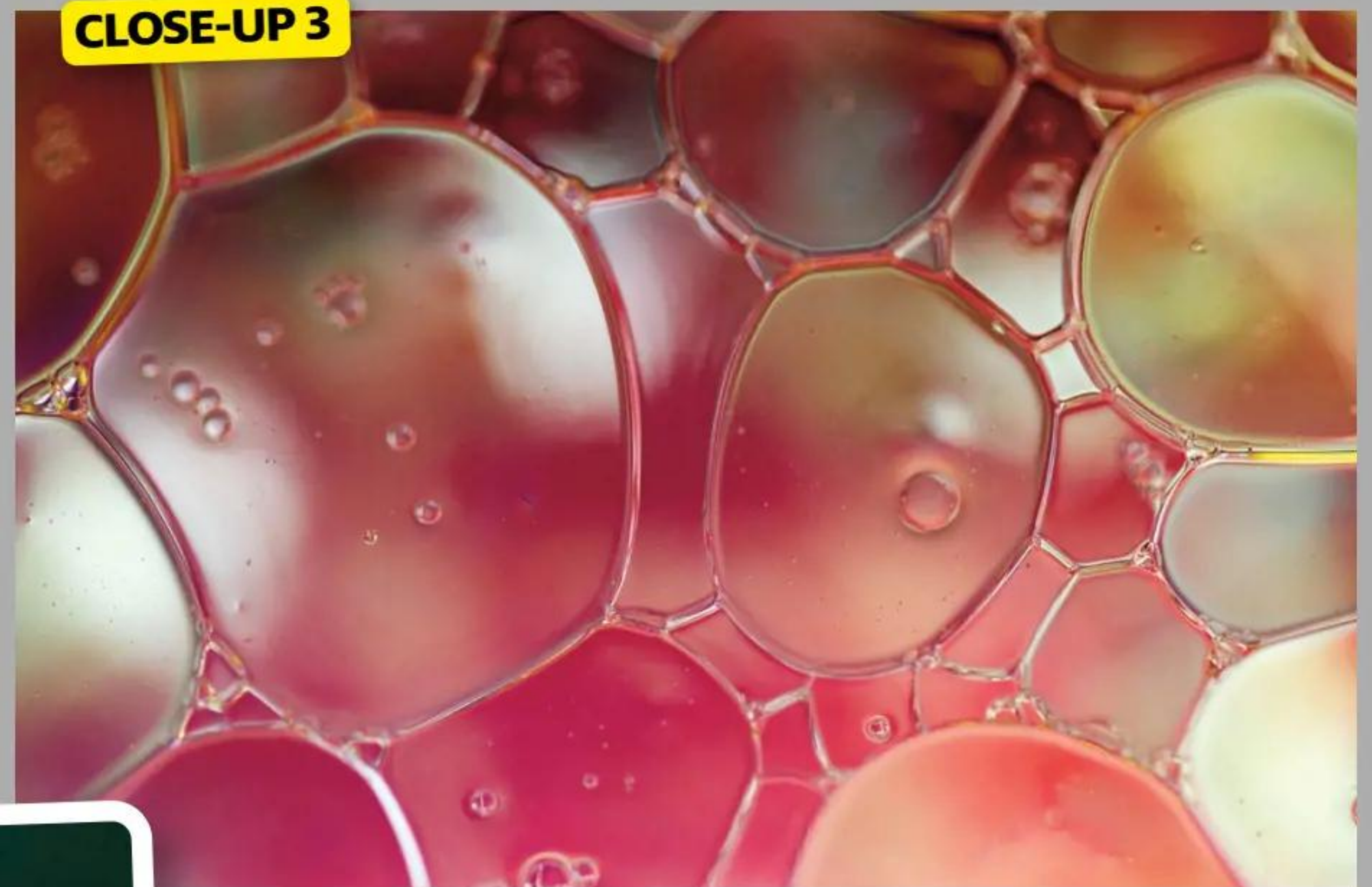
CLOSE-UP 1



CLOSE-UP 2



CLOSE-UP 3



Focusing is critical when shooting macro subjects, especially when working at wide apertures. In this shot, even a tiny adjustment to the focus ring meant that the focus was on the petals behind the stamens





MASTER YOUR EOS IN 12 HOURS

Take control of your Canon camera, and start taking top shots in just one day – we can guarantee great results!

Buying or upgrading to a new Canon camera is exciting for any amateur photographer. However, that excitement can soon give way to frustration when you discover that you can't get the best out of your EOS because you're overwhelmed by all the options and features, and you find that your photos just aren't coming out as you'd hoped.

The *Canon Photographer's Handbook* team are all dedicated Canon photographers, and we're here to

help you be the boss of your camera and get great pictures; but we're also aware that your time is precious, and that you don't have endless days to spend trying to master digital photography. So, over the following eight pages, we've created an easy-to-follow guide designed to help you take control of your camera, improve your shooting skills and start capturing the shots you've always wanted – in just 12 hours! So set your alarm, and let's get started...

All images Peter Travers



TIP OF THE HOUR

Start early for landscapes

Mornings are a great time for shooting landscapes. Because the sun is lower, skies retain more colour, and the light is softer, so you avoid harsh shadows and glare; it all makes for great scenic shots with that 'pro' feel.



Learn basic camera settings

Along with shooting Raw for the best image quality, and for more control at the processing stage, here are three key camera settings that will give great results in most situations...

AUTO WB



DAYLIGHT WB



Shooting mode

1 We usually shoot in the semi-auto Aperture Priority mode (Av on the top dial of your EOS DSLR) and suggest you do the same! In Av mode, you set the aperture, and your camera sets the shutter speed for a standard exposure; this enables you to control depth of field – see Tip #6 for more.



Metering mode

2 We generally stick to the Evaluative metering mode on our EOS DSLRs, as it's good for 95% of our photography. As with all metering modes, you'll sometimes need to fine-tune the exposure by dialling in positive/negative exposure compensation to brighten or darken your photos – see Tip #2 below.



White Balance

3 Our pair of shots above show the difference between using Creative Auto mode, which uses Auto White Balance (AWB), and using Av mode and setting the WB manually. In this case the Daylight WB preset creates flattering, warmer colours in the wheat than the colder AWB image.

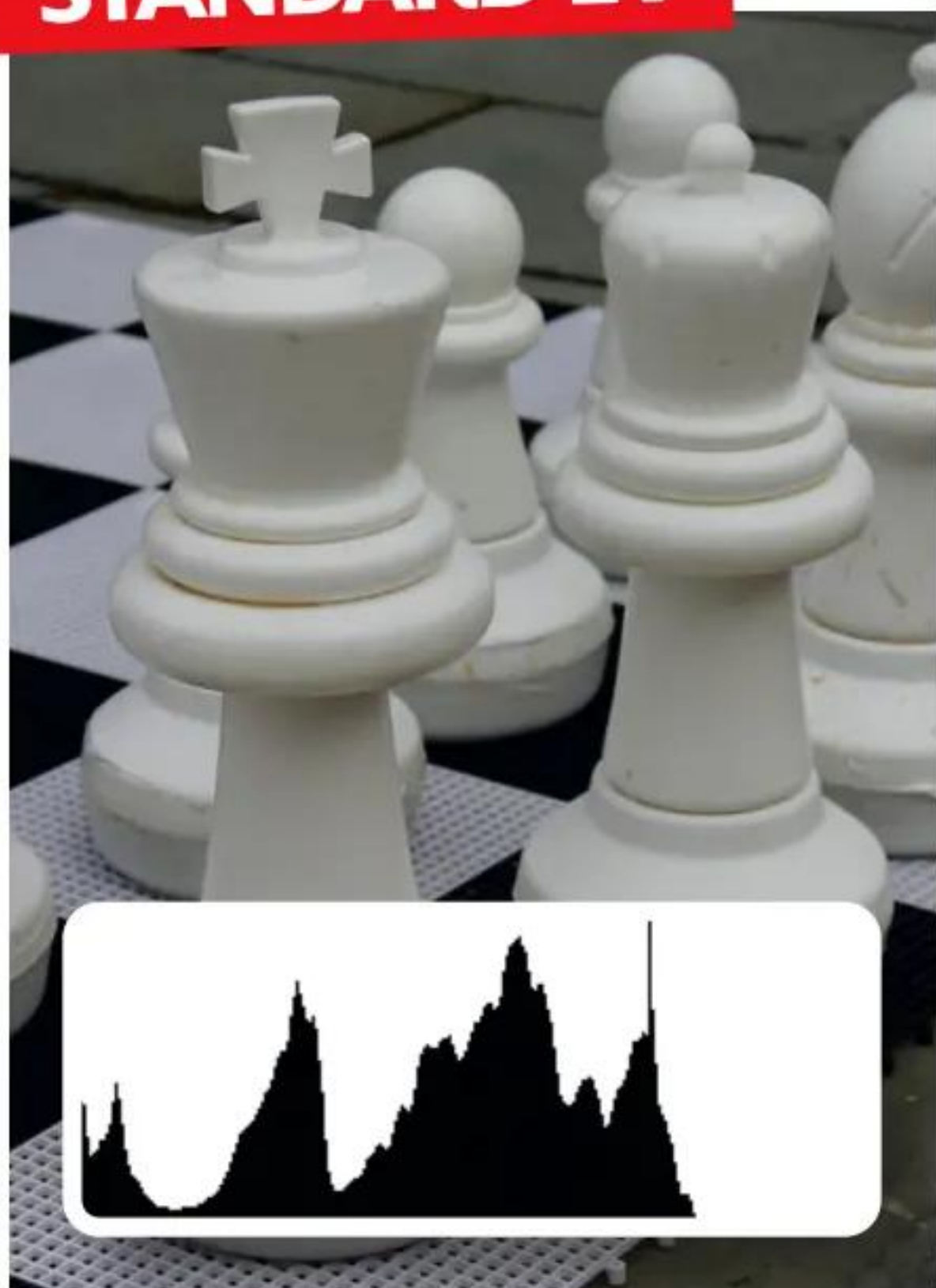
Exposure compensation

Your camera will produce an accurate exposure for your scene or subject most of the time, but it can get confused if you're trying to photograph something that's mostly white or black (or has very light or dark

tones), and you'll often end up with dull bright subjects or overly bright dark subjects. To avoid this common problem, you need to learn how to fine-tune your exposures. Check your shots using the histogram that's

available in Playback mode, and 'dial in' the required amount of exposure compensation – for example +1 stop to brighten a dull light-coloured subject, or -1 stop to darken a washed-out dark subject.

STANDARD EV



Light subjects underexposed; the histogram displays no highlight information at the right-hand end

+1 STOP EV



Light subjects correctly exposed; the histogram displays plenty of highlight information

STANDARD EV



Dark subjects overexposed; the histogram displays no blacks at the left end, and few dark midtones

-1 STOP EV



Dark subjects correctly exposed; the histogram displays plenty of blacks and dark midtones



7:00am – MORNING

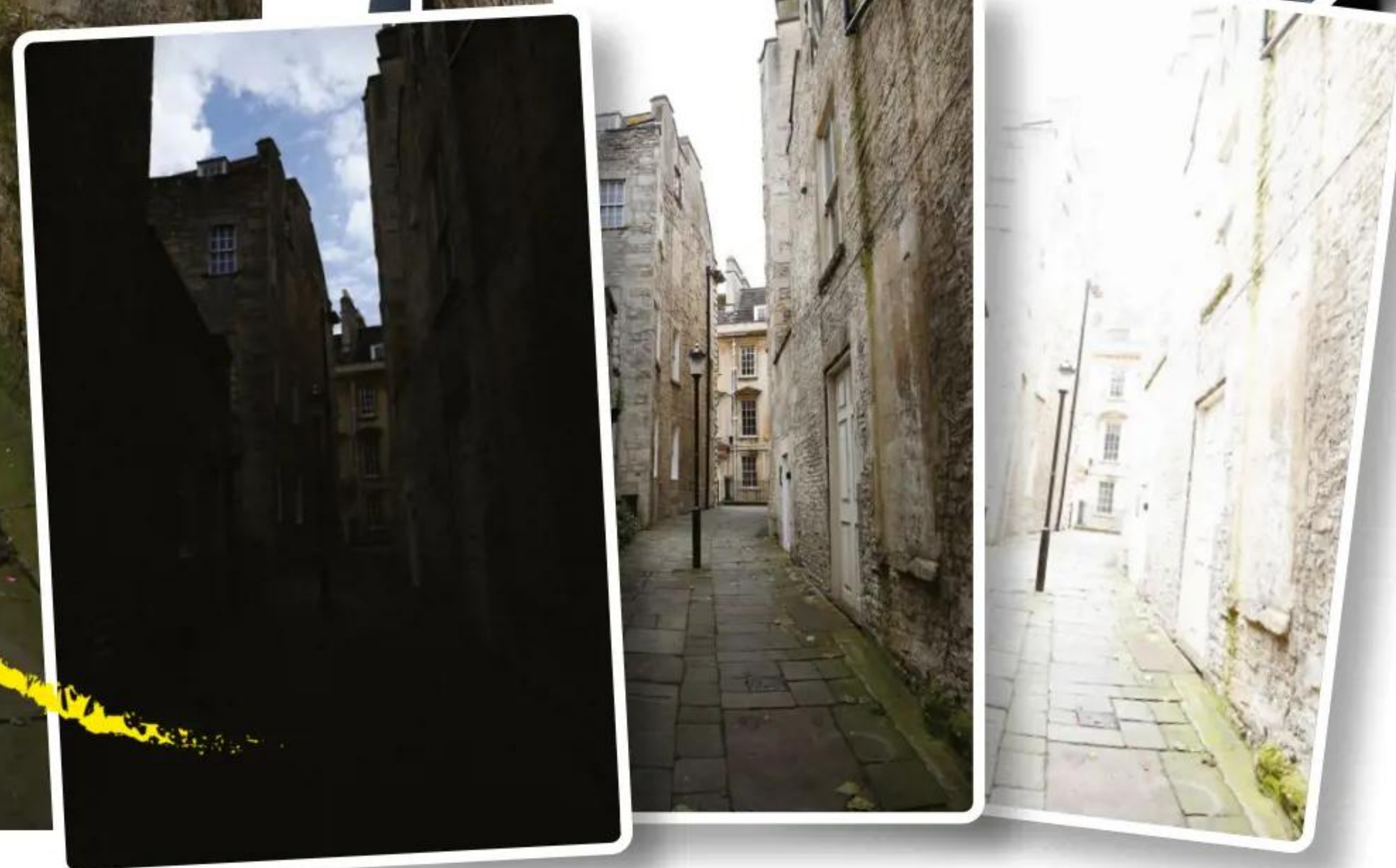
In-camera exposure control

All Canon EOS cameras have some sort of built-in settings to help you capture the best possible exposure in tricky high-contrast conditions. Earlier cameras, like the Rebel XSi and 80D, have HTP (Highlight Tone Priority) settings which help to minimise blown highlights (overexposed areas with no detail). Later cameras, such as

the Rebel T5i and 5D Mk IV, have a clever in-camera HDR (High Dynamic Range) feature; when you use this, your camera takes three exposures (like bracketed exposures – standard, under and over) and merges them into an HDR image that reveals detail in the shadow, midtone and highlight areas of your scene.



HDR MODE



Lens: Canon EF 24-105mm f/4L IS USM
Exposure: 1/1600 sec, 1/200 sec and 1/25 sec at f/9; ISO400



11:00am – MID-MORNING

TIP OF THE HOUR

Shutter speeds for sharper shots

As there's more light at this hour, you'll be able to obtain a faster shutter speed – ideal for ensuring that you capture pin-sharp shots when shooting handheld.



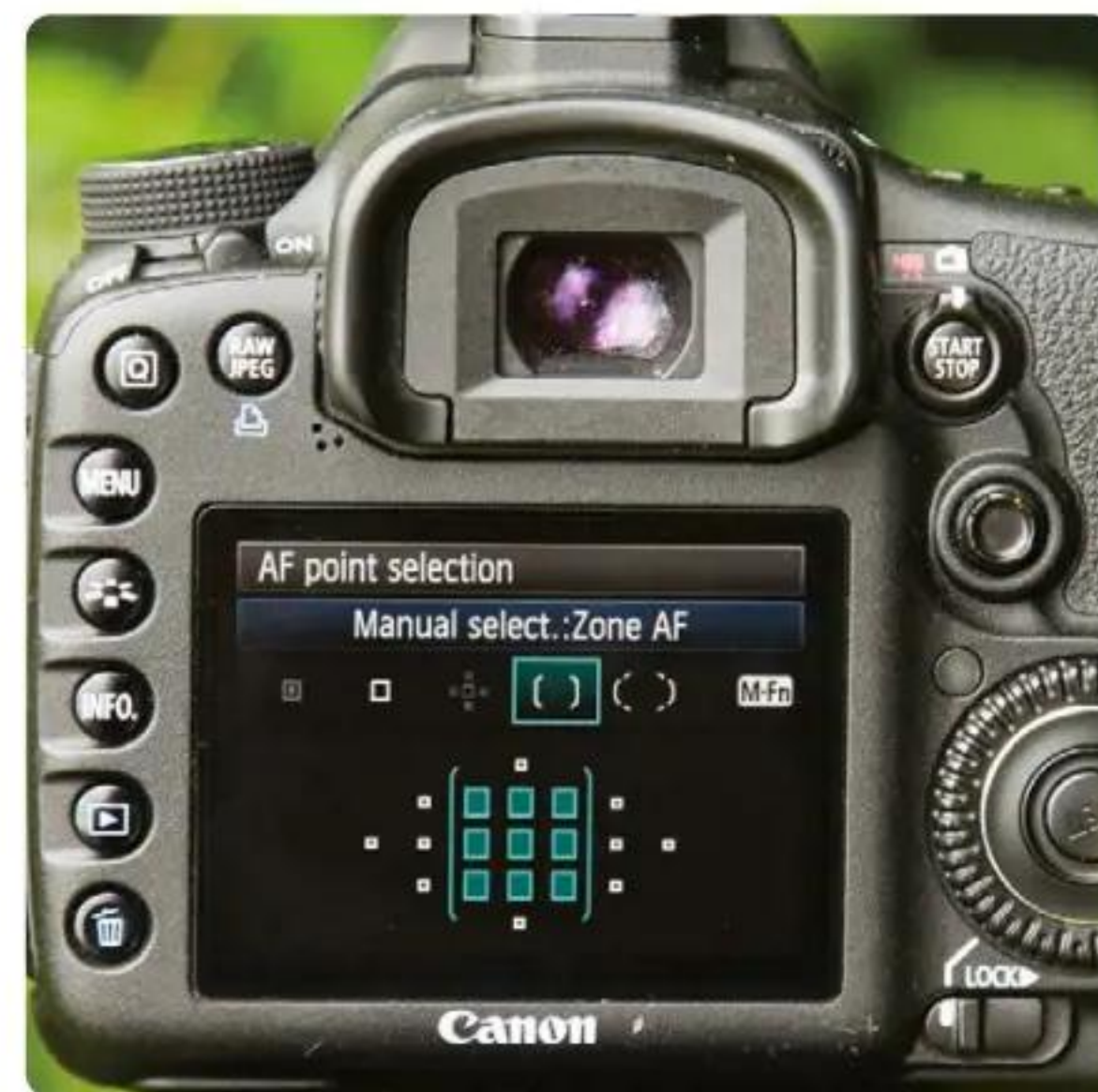
Set up for focusing

Once you've mastered the basics of exposure it's time to nail focusing, by learning how to use your camera's autofocus points to make sure you're controlling which parts of a scene are sharp, and not leaving it to the camera.



Auto select: 19 point AF

1 Many of the Auto shooting modes on your EOS DSLR will utilise this Auto AF point selection setting, but while it can sometimes intelligently lock the focus on your subject, it will often focus on what's closest to you – which may not be your subject if it's further away, and you're focusing creatively with a shallow depth of field, as in the image below.



Manual Select: Zone AF

2 High-end EOS DSLRs include a 'Zone AF' option, which enables you to select a cluster of AF points rather than a single point. When you select this option only the points within the selected zone will be active. This mode can be helpful if you're trying to focus on a moving subject, such as an animal, that would be hard to lock onto using a single AF point.



Manual Select: Single Point AF

3 To really take control we'd urge you to get used to manually setting single AF points, so that you can quickly and accurately focus on whatever part of your scene or subject you want. Using off-centre AF points can be helpful for improving your compositions for more interesting and dynamic framing.

AUTO AF POINT SELECTION



MANUAL AF POINT SELECTION



Lens: Canon EF 70-200mm f/4L IS USM
Exposure: 1/320 sec at f/4; ISO400

Lens choices

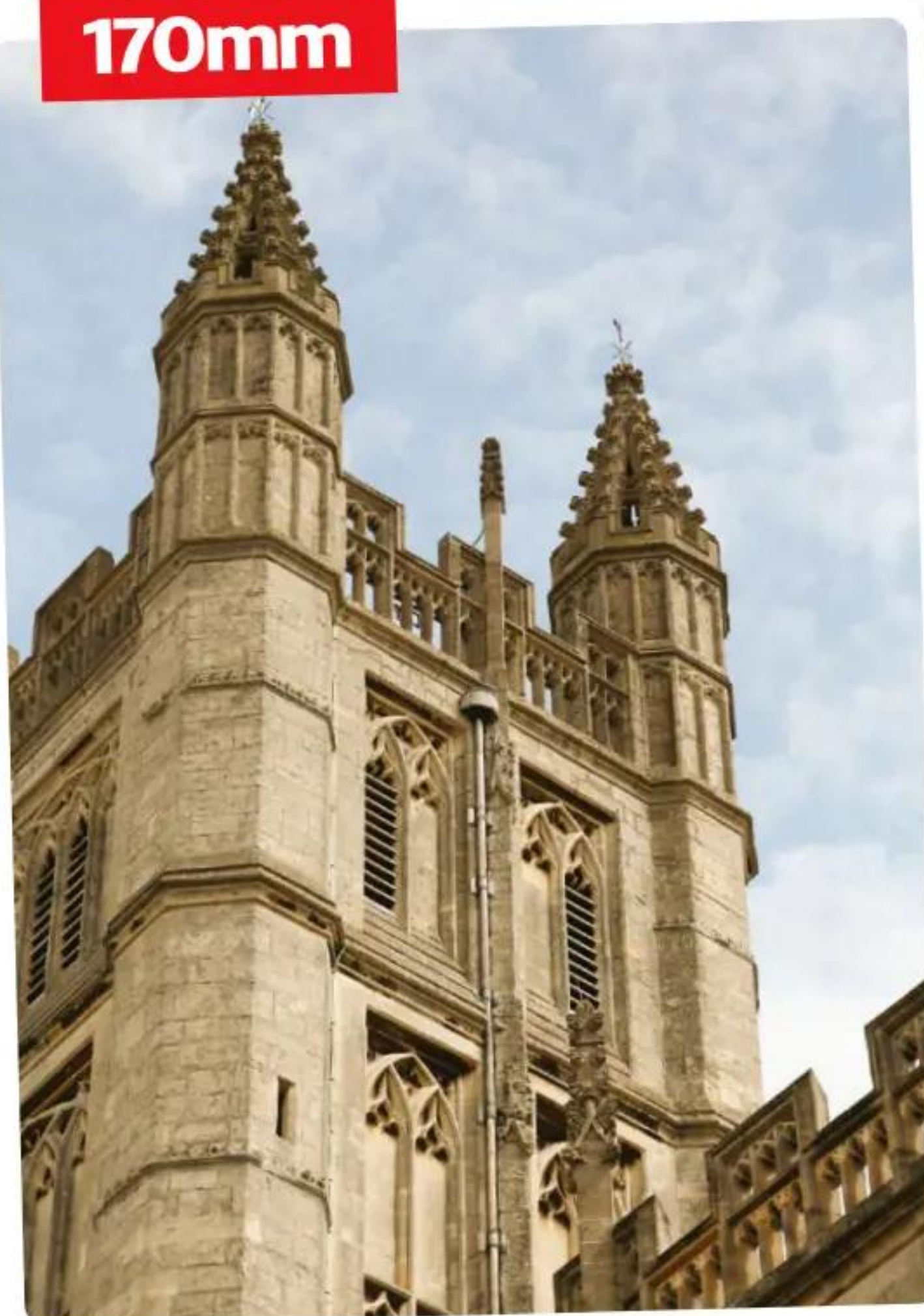
One of the big benefits of using EOS DSLRs or EOS R mirrorless over compact cameras is that you can change the lens to suit the subject you're photographing and the kind of effect you want. However, understanding lenses and focal lengths can be tricky, so we'll simplify things for you. The lower the number in millimetres (mm),

the wider the angle of view and so the 'wider' the lens; the higher the number, the tighter the angle of view and the longer the telephoto reach of the lens. Any focal length below around 35mm is considered wide-angle, between around 35-85mm is standard, and above 85mm is telephoto.

Lens: Canon EF-S 15-85mm f/3.5-5.6 IS USM
Exposure: 1/500 sec at f/5.6; ISO200



170mm



85mm



DoF techniques

Three factors control depth of field (DoF), or how much of a scene is in focus from the front of your frame to the back: your aperture setting, your lens's focal length and your distance from the subject or focal point. **1.** Wide apertures (eg f/4) will capture shallow DoF, turning backgrounds into pretty blur; narrow apertures (eg f/16) will capture large DoF, keeping the whole scene in focus.

2. Wide-angle (eg 18mm) lenses will capture more DoF, while telephoto (eg 100mm) lenses will capture less DoF.

3. The further you are from your subject, the more DoF you'll obtain, while the closer you are to your subject, the less DoF there will be.

18mm



55mm



100mm



18mm



This sequence of photos were all shot at a consistent wide aperture of f/5.6 to illustrate how focal length and your distance from the subject affects DoF. The top three are wide compositions: at a wide-angle of 18mm, more of the

55mm



background is in focus and in view; at 55mm the angle of view is reduced and the background starts to blur; while at a telephoto focal length of 100mm, the DoF and angle of view is further reduced. The bottom three images are

100mm



closer compositions: at 18mm, the hedge is in view and only slightly blurred; at 55mm the DoF and view is reduced; while at 100mm, the DoF is much shallower, knocking the backdrop completely out of focus. ▶



3:00pm — MID-AFTERNOON

Successful compositions

Several factors affect whether or not a shot is effective in terms of composition. As our examples show, how you position the subject in the frame can have a big bearing on the outcome. Consider how close you are to a subject; if you're very close you're likely to need a wide-angle lens to fit in bigger subjects, but if this causes the subject to become distorted, consider moving further away and zooming in so it's not too small in the frame, and to avoid leaving 'dead space' around it.

Think about which orientation best suits a subject – horizontal (landscape) or vertical (portrait), and utilise the compositional aids on your EOS. Displaying the grid when you're using Live View can help you apply the 'rule of thirds' for well balanced images, and if the display features a level you can use this to ensure that your horizons are straight; if your EOS doesn't have a built-in level, you can buy a hotshoe spirit level for as little as £5.

TOO CENTRAL

The church is too central, resulting in a boring and undynamic shot

BAD POSITIONING

Placing subjects off-centre is a good idea, but here the church looks awkward and lost in the frame

TOO WIDE

Vertical compositions can work well, but in this case there's far too much empty space in the foreground and sky, and the subject is too small in the frame

WELL-BALANCED COMPOSITION

This is a well-balanced composition, with the church's tower off-centre but still dominating the frame, and enough of the surroundings included to create context



Lens: Canon EF 24-105mm f/4L IS USM
Exposure: 1/400 sec at f/11; ISO200

NO POLARISER

POLARISER


Boost colours and contrast

At this time of day, the sunlight can be strong, producing deep shadows that are ideal for creating contrast between tones and adding depth to scenes. But if you want to really emphasise the colours and contrast of your landscapes, fit a screw-on circular polarising filter to your lens. Polarisers are great for boosting the colour of blue skies and creating contrast with white clouds for a more striking result, and they also cut through glare on water and other reflective surfaces, so you can see the true colours instead of patches of clipped highlights. For the best results, shoot at 90 degrees to the

sun, turning the filter to adjust the intensity of the effect. Note that using a polariser will reduce shutter speeds, so if you're shooting handheld be prepared to increase your ISO to 200, if necessary, to enable a fast enough shutter speed.

TIP OF THE HOUR Shoot for mono

As the sun is higher and brighter around the middle of the day, shadows become stronger. This means it's a great time to shoot landscapes and cities with a view to converting them to black-and-white (see Tip #11), to emphasise the depth and detail of the highlight and shadow tones.



Portraits in the shade

Many beginners think portrait shots (whether of people or pets) are best taken out in the sunshine at this time of day – but this is actually a bad idea, unless you know what you're doing! For starters, get your subjects into the shade – under a tree, against a wall, or in a doorway – to minimise harsh highlights and ugly shadows on faces, and to reduce squinting and other unflattering facial expressions. You can use a reflector to bounce light onto your subjects' faces to lighten them in needed.

If you're stuck out in the sun with no shade to hand, you can use 'fill-in' flash to overpower the shadows caused by strong sunshine – see the Canon Workshop on page 118 for an in-depth guide to fill flash techniques. ▶

IN DIRECT SUNLIGHT

IN THE SHADE




7:00pm – EVENING

Zoom in and slow down

When you're shooting landscapes, although it may be tempting to try and fit everything you can see into the frame, this will rarely make for a good shot, as our wide-angle example here shows. Although the flowing weir is in shot, there's too much dead space in the water and sky, and the most interesting elements are tiny. The 1/6 sec shutter speed has all but frozen the choppy surface of the water too.

Our tighter shot is much improved, as we've zoomed in on the interesting elements – the boats and the old mill – cutting down the amount of empty sky and water. We've also used a longer shutter speed of 2.5 seconds, which has turned the water into a pleasing blur.



Raw black-and-white conversions

When the sun has set, you can head home. And once you've got your shots onto your computer, why not convert one of your colour landscapes to black-and-white? Mono effects are a great way to take an image to a more artistic level – and rather than converting a JPEG in Photoshop CS or Elements, here's how to convert a Raw image to mono in Adobe Camera Raw for maximum quality.



Go square!

1 Open your Raw image in the Adobe Camera Raw editor in Photoshop CS or Elements. First off, select the Crop tool, right-click on the image and select 1x1 from the menu for an artistic square crop. Choose Show Overlay from the same menu to compose the image according to the rule of thirds.



Remove the colour

2 Drag the Saturation slider to -100 to apply a simple colour-to-mono conversion. You can use the other sliders to enhance the effect – we nudged the Contrast slider up to +60, and set Blacks to 15 to darken the shadows. The Clarity slider is great for enhancing contrast and detail in midtone areas.



Push it further

3 The major benefit of processing Raw images is that you can push the sliders quite hard without introducing noise or banding. You can use Recovery to pull back blown highlights in skies, but here we've gone the other way, increasing Exposure to lighten the sky to enhance the fine-art mono look.

Go super slow with filters!

Evening is the best time of day to experiment with slower shutter speeds as light levels are lower, which is ideal for using long exposures to capture creative blur. And a great use of creative blur is to slow down the movement of water to create a smooth, glass-like effect.

Rather than just shooting at the narrowest aperture, and therefore the slowest shutter speed available (eg f/22 at 1/4 sec), for super-smooth water effects, you'll need a really long exposure (eg 20-30 seconds at f/22). And for that, you'll need to use a strong neutral density

(ND) filter to reduce the amount of light hitting your sensor. For the long exposure shot below, we used a screw-on variable ND filter, and used it on its middle setting – avoid using these variable NDs at their maximum setting, as the dual polarising elements will cause ugly dark blotches: note this

problem gets worse the wider your focal length.

As with all long exposures, use a tripod for shake-free shots, shoot at ISO100 (ISO50 on pro EOS cameras) to enable the slowest shutter speed, and use a remote release or Self-Timer mode. You can also use an ND grad filter (with your

ND filter if you wish) to tone down bright sunsets and balance the exposure. ■

TIP OF THE HOUR Catch the last light

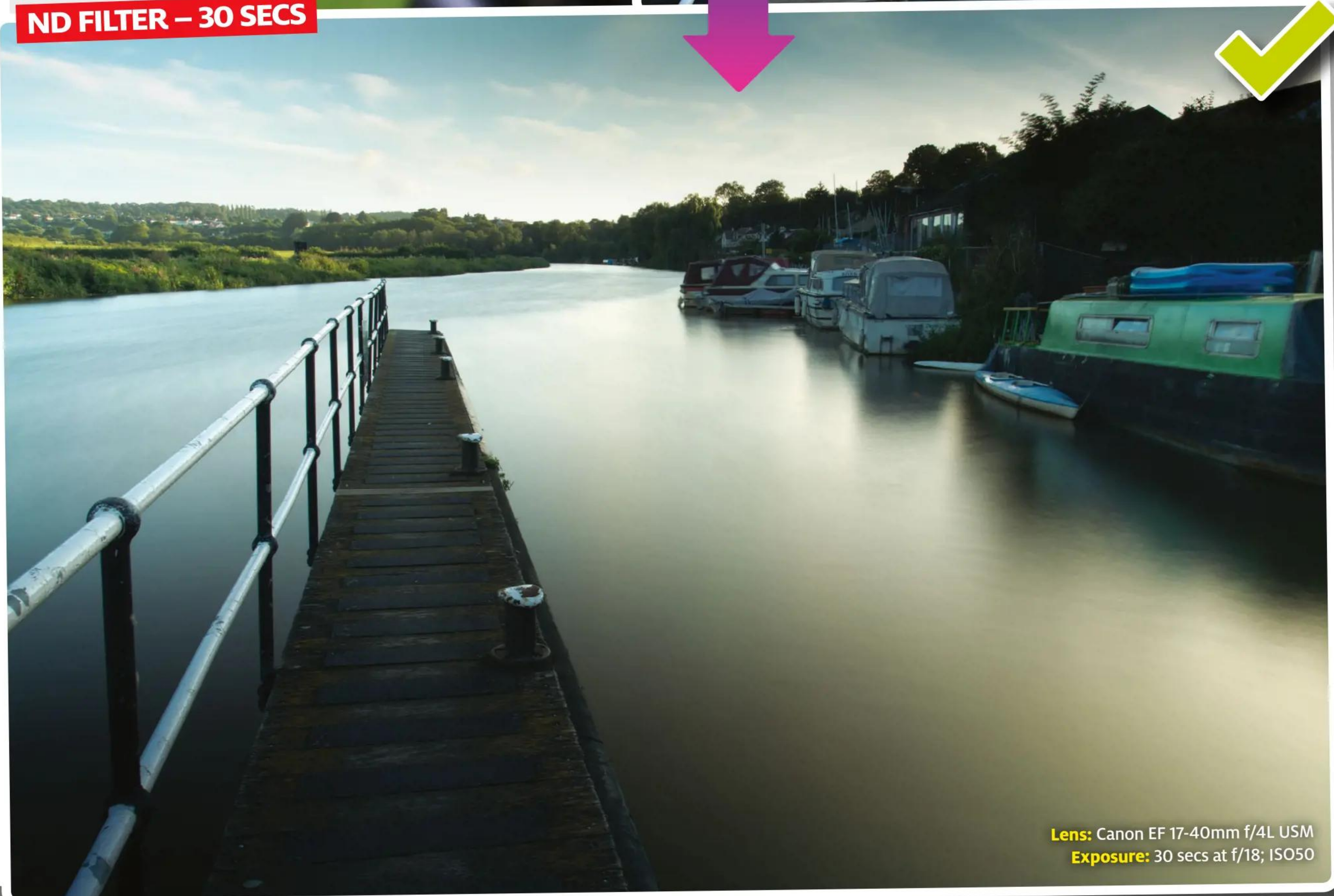


Some of the best shooting opportunities come at the end of the evening, when the sun has just disappeared over the horizon but the sky is still light. You can capture vivid colours with little risk of overexposing – but you need to be quick!



ND FILTER – 30 SECS

NO ND FILTER – 1/6 SEC



Lens: Canon EF 17-40mm f/4L USM
Exposure: 30 secs at f/18; ISO50



20 WINNING TIPS!

SPORTS SKILLS

Learn the best camera settings and techniques for capturing better sports and action photos

There are countless sporting events and opportunities on your doorstep these days, so what better time to improve your sports photography skills, and learn how to take winning shots of your own with your Canon EOS camera!

We appreciate that only a select few have tickets to major sporting competitions, and fewer still have trackside access or coveted press photographer passes. So over the

following ten pages we're providing 20 essential techniques you can use for any kind of action photography, whether it's a 100 metres final or a school sports day, an NFL football game or the kids having a kickaround in the local park. From track and field to cycling, motorsports to airplane aerobatics, we'll cover all the camera settings and techniques that you'll need to help you shoot for gold!

FEET FIRST!

The best techniques for photographing athletics – or hyperactive children!

1 Telephoto lens choice

Long telephoto lenses are great for shooting action or sports, as often you'll be quite far from your subjects, sitting in stands or behind railings. Telephotos also enable you to really 'fill the frame' with the action, even from a distance. But should you go for a zoom or prime lens? Prime telephotos (eg Canon EF 300mm f/4L IS USM) are good for sports where you know the subject will be in the same place for a good amount of time – a motorbike hitting the same part of the track, or a batter at the box. Primes also offer superior optical quality and image results, as they have fewer moving parts than zooms. Telephoto zooms (eg Canon EF 70-200mm f/4L IS USM) give you greater scope and choice of focal length, and are better for things like ball sports, where your subjects' movements are unpredictable and you'll need to zoom in and out to capture shots.



Exposure 1/1000 sec at f/5.6; ISO500
Lens Canon EF 100-400mm f/4.5-5.6L IS USM

2 Add motion blur in Photoshop

If your action shots are lacking that essential feeling of motion, you can add it using Photoshop!



Select your subject

1 Open your image in Photoshop CS or Elements. Duplicate the top layer and use the Quick Selection tool to select your subject. Click-and-drag to 'paint' the selection, or hold down Alt to remove areas.



Refine the selection

2 Use Refine Edge to feather the edge of the selection, then press Ctrl+I to inverse the selection so that you can blur the background but not your subject. Now go to Filter > Blur > Motion Blur.



Add some motion

3 Adjust the Angle to suit the direction your subject is travelling in, then use the Distance slider to adjust the amount of blur – we used 295 pixels here, but different images will need different values. Click OK.



3 Av mode rules!

Your Canon camera has many shooting modes, from fully automatic scene modes to semi-auto and Manual creative modes for total control. Some entry-level and enthusiast EOS cameras offer a Sports mode, but while this may seem an obvious choice for action, it severely limits your options – you can only shoot JPEGs; ISO and AF will be set to auto and so on. To take control and get the results you want, we'd suggest you shoot in the semi-auto Av (Aperture Priority) mode. In Av mode you set the aperture, and your camera sets the shutter speed for a standard exposure. You can also shoot on the Raw quality setting for better results, and you can control ISO, Drive mode, AF mode, AF points and other settings. Use a wide aperture (f/4 to f/5.6) to lift your action and sports subjects out of their surroundings.



4 Winning shots

Few of us will be fortunate enough to have press passes that allow you to get trackside to photograph national or international events, but whether you're photographing the world's fastest athletes or your local sports day, the Canon camera techniques to capture action-packed shots of running subjects are the same. Get down low to reduce the amount of empty foreground, be aware of the background (move if necessary), use a long telephoto lens, and fire away! You'll also want to capture the salient moments of the event: this might be when athletes are jostling for position (as in our shot above), when their faces are racked with exertion, or the elated look on the winner's face.



5 The point of focusing

Use the Single AF point selection setting when there's a risk that, if you use Auto AF Point selection, your camera is likely to focus on the wrong/closest part of your scene, rather than your subject. When photographing this national athletics event we selected the central AF point, and kept that fixed on our chosen athlete at all times during the 100-metre sprint. We fired continuously using Continuous Shooting mode and AI Servo AF, so the camera automatically tracked the athlete, and adjusted the AF to capture a sequence of sharp shots to choose from.

BICYCLES & BALLS!

Learn to capture creative action shots with and without flash

6 Sharp sports shots

When you're photographing anything that moves – whether it's sports, people or wildlife – you need to ensure your shutter speed is fast enough to capture sharp shots. We go into more detail about shutter speeds over the page, but first up you need to set your shutter speed to overcome camera shake relative to your lens's focal length. The longer the focal length, the



more it will amplify any camera movement, especially at telephoto focal lengths of 300mm or 400mm.

Remember the rule for sharp shots with crop-factor cameras such as the 700D/T5i and 7D Mk II: match your shutter speed to your effective focal length. So, at 300mm on a 1.6x crop factor camera it's 420mm, so you need the next available shutter speed, which is 1/500 sec. Increase your ISO setting if necessary.



7 Off-camera flash

The latest Canon EOS cameras enable you to wirelessly control remote Canon Speedlite flashguns via easy-to-use in-camera menus, and this opens up a whole new world of photographic opportunities. The camera's built-in flash acts as a 'master' unit, which sends encoded instructions to fire the flashguns as 'slave' units – most Canon-compatible flashguns offer this 'slave' feature. By positioning your flashgun(s) on stands to the side of your subjects, you can create dramatic shadows that will add depth and dynamism to your shots. In your camera's menu, you can set different flash power ratios for both your on-camera flash and up to three groups of remote flashguns to light your action subjects creatively.

8 Sync up your flash

You can control how your flash (both built-in and flashguns) fires during slower exposures of less than 1/30 sec to great artistic effect. However, if you use the default first-curtain-sync flash setting when photographing moving targets, the flash fires at the start of the exposure, freezing the subject but capturing their subsequent movement as a blur in front of them – giving the impression that they're moving backwards! You can set the flash to second-curtain-sync in your camera's menu; on this setting the flash will fire twice, once when you press the shutter button, and again immediately before the end of the exposure. This means that you'll capture motion blur *behind* your subjects, which will help to emphasise their movement!



Exposure 1/30 sec at f/7.1; ISO400
Lens Canon EF 24-105mm f/4L IS USM

9 Create a stroboscopic stop-motion effect

This is a cool technique that's not as hard to master as you might think. Choose an action subject you can control – we chose a golfer as their swing creates a nice arc of motion, and we could get him to swing a few times until we bagged our shot, but you could try a gymnast or tennis player. Shoot at night or in a dark indoor setting, as you'll need an exposure of around one second; in daylight you'd get overexposed shots. Focus

manually on your subject, and start off with an exposure of around 1 sec at f/5.6, ISO100. To get the stroboscopic effect you need to set the flash to Multi mode (this isn't supported in all flashguns) and a frequency of 30Hz (30 flashes per sec). So the flash can keep up, reduce the flash power to 1/64 of full power. Top tip: Use white electrical tape around the golf club shaft so it stands out when it's dark!



10 Capture the competitive spirit

One of the reasons sportsmen and sportswomen make such great photographic subjects is because of the competitive spirit that can come through in photos – as long as you're looking out for it! Whether your subjects are professional or amateur, adults or juniors, when you're taking pictures of people competing, try to convey the competitive atmosphere by capturing looks of determination/elation/disappointment on people's faces. These expressions can really bring sports shots to life!



HOT WHEELS!

Get in the fast lane and rev up your motorsports skills



11 AI Servo AF

Your Canon EOS camera has different AF (autofocus) modes, which you can select depending on whether what you're shooting is moving or not. If your subject isn't moving, stick with One Shot. If it is, switch to Servo AF mode, and use subject detection AF. This is designed for moving subjects, and will automatically track them and keep them in focus; place an AF point over your subject and half-press the shutter button, and your subject will be focused continuously. Use this setting with the Continuous Shooting drive mode to further increase your hit rate – you won't get every shot pin-sharp, but you'll get more sharp shots than not, and more than if you stuck with One Shot AF.



12 Framing fixes

As with all photography, how you position action subjects in the frame, and how big or small they appear in relation to their surroundings, will have a big impact on your shots. Plan ahead, visualising how you want your shots to look; do you want to fill the frame, or go a little wider to include more of the surroundings and set the scene? Where in the frame should your subject appear? The rule of thirds works as well for action as it does for landscapes, but consider other elements to help your compositions. Look for leading lines – such as the lines on an athletics track – or elements such as smoke trails from planes or steam from trains that can fill an otherwise-empty sky.



13 Manual focus

It may seem counterintuitive to manually focus on a subject that's travelling fast, but the idea is not to focus on the subject, but on where you know they'll be! Use AF to pre-focus on a spot the subject will hit or pass over – such as a corner for motorsports – then switch your lens to manual focus to lock the focusing. Using this technique means there's no lag as the AF struggles to lock on – but it is then down to you to time the shot. Use Continuous Shooting drive mode to get shots before, during and after your subject passes the point you've focused on, to increase your chances of success.

Exposure 1/800 sec at f/5.6; ISO100
Lens Canon EF 300mm f/4L IS USM

14 IS won't stop motion blur!

It's a common misconception that using the IS (image stabilisation) setting on your lens will help you to take sharp shots of action or sports subjects. IS is designed only to help reduce blur in shots that's caused by camera-shake; even the slightest movement during an exposure can be enough to produce a blurred result if your shutter speed isn't fast enough. The only way to completely freeze an action subject's movement is to use a faster shutter speed.

So how fast do you need to go? It depends on what you're shooting; a shutter speed of 1/125 sec can be enough for athletics, 1/250 sec for cyclists, 1/500 to 1/800 sec for motorsports and 1/1000-1/2000 sec for airborne subjects. Bear in mind, though, that these speeds may change depending on a subject's direction of travel – if they're coming towards you, you can get away with a slower shutter speed than you would need if they were travelling across the frame.



1/500 sec



1/100 sec

15 Convert to mono to add atmosphere

Shots of steam trains or propeller planes are perfect for converting to black-and-white for a vintage look



Start in colour

1 For the best results, and greater control over the mono conversion, process your shot in colour first. Boost colours, contrast, and shadow and highlight detail before converting to black and white.



Convert to mono

2 Use a Black & White adjustment layer in Photoshop CS, or the Convert to Black and White command on a duplicate layer in Elements. Try out the preset styles, then fine tune the effect using the sliders.



Add some grain

3 Adding a little grain to mono images enhances the atmosphere. Go to Filter > Filter Gallery, and select the Grain filter. Here we've set Intensity to 30, Grain Style to Clumped and Contrast to 40. ►

AIRBORNE ANTICS!

Take striking shots of aeroplanes and helicopters

16 Auto AF points

We often talk about the benefit of using single AF points for greater control and accuracy (see Tip 5), but Auto AF point selection is ideal for photographing airplanes in flight; there's generally nothing else in the frame (or in the air) to confuse the AF system, and it'll lock on to your airborne subjects more quickly if all AF points are active across the frame.



17 Stability for sharp shots

When you're using big telephoto prime or zoom lenses to photograph airborne subjects, not only will your arms and shoulders quickly tire, you'll also find it difficult to hold heavy lenses still for sharp shots. To help give your limbs a rest, and to ensure your camera and hefty lens is steady for sharp shots, use a monopod or tripod for a bit of physical support. Better still, invest in a good gimbal head for your tripod, and you'll be able to smoothly manoeuvre your long lens to easily keep up with the fast-moving action in the air above!



18 Exposure compensation

Shooting against an expanse of sky can fool your camera into underexposing shots, especially if the sky's full of clouds, as it thinks anything white should be grey. Counter this by using exposure compensation to brighten up shots. In Av, Tv, P or M mode, you can 'dial in' up to +/- 5 stops of compensation, depending on your EOS model.

Try +1 stop, and when you review shots, turn on the Highlight Alert if available to check the sky's not blowing out; if it is, that area will flash on screen and the histogram will be cut off at the right edge.



Higher ISOs enable you to use a fast shutter speed and still be able to capture a good depth of field

19 ISO for more DoF

We often encourage you to increase your ISO setting (from ISO100 to 400, 800 or 1600, depending on the lighting conditions) to ensure that you can use a fast enough shutter speed for your subject and lens focal length, but there's another way in which increasing the ISO can be useful. You can use it to enable you to choose an aperture that will give you greater depth of field, while still being able to select a fast enough

shutter speed to shoot handheld.

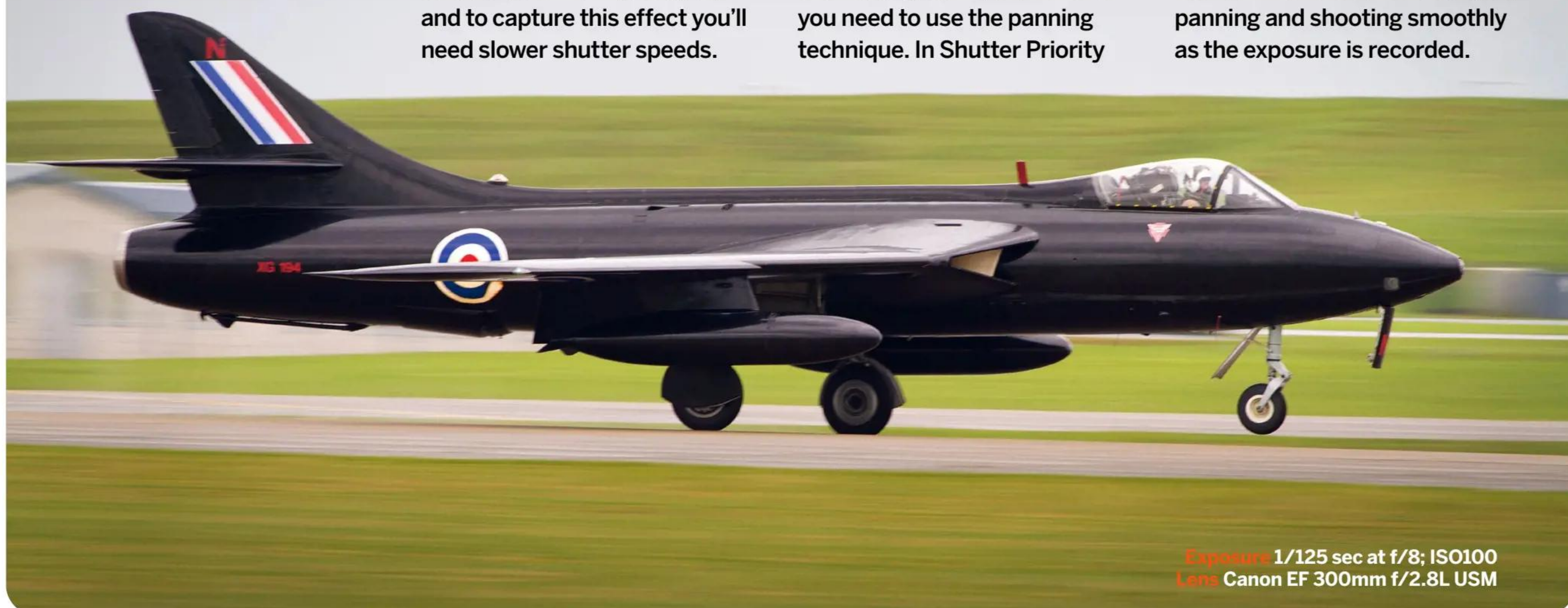
This is perfect for shooting airborne subjects, as it enables you to get a sharp shot of the entire subject (rather than the wings, but not the nose or tail), and will also give you more depth of focus, which will make it easier for the camera to achieve autofocus. Try increasing the ISO, then setting your aperture to f/8 or f/11 and shutter speed to 1/1000 sec, and see your shots improve.

20 Panning for gold!

Although fast shutter speeds are ideal for pin-sharp shots of action and sports, sometimes freezing a moving subject can make it look like it's stationary! Creating motion blur, in either the subject or the background, tells us it's a moving subject, and to capture this effect you'll need slower shutter speeds.

If you want to blur a subject but keep its background sharp, use a tripod, as you'll need to keep your camera completely still while you use a slower shutter speed. However, we prefer to keep subjects sharp and blur their background, and for this you need to use the panning technique. In Shutter Priority

(Tv) mode, select a shutter speed around 1/100 sec, stand back and use a mid-range zoom lens at around 100mm, giving yourself space to pan. In AF mode, pre-focus on the line the subject will be travelling, then lock to MF and track the subject, panning and shooting smoothly as the exposure is recorded.



Exposure 1/125 sec at f/8; ISO100
Lens Canon EF 300mm f/2.8L USM



All images (unless stated) Peter Travers

BETTER CANON PHOTOS

PERFECT PORTRAITS

Learn new Canon camera skills and clever shortcuts for better pictures of people

One of the main reasons many of us invest in a EOS camera in the first place is to take pictures of people. But whether it's friends and family or professional models, there's a distinct difference between quick snaps and carefully constructed portraits. So, to help you improve your people photo skills and EOS techniques, here's our comprehensive guide to portrait photography. Over the following pages

we'll show you all you need to know to take better portraits, from setting up your Canon for the best exposure and aperture to focusing advice and lens choice. We'll also show you the best ways to compose your portraits and pose your subjects, our top techniques for shooting using natural light and reflectors, plus we'll reveal the best ways to use flashguns and home studio setups to help you capture stunning results.

Canon camera settings

Get your camera set up for portraits to flatter your subject

APERTURE CHOICE

Open up wide and shoot fast!

When taking portraits using natural light (without flash), whether indoors or outdoors, it's best to use wide apertures between f/2.8 and f/5.6. A wide aperture means you'll be able to use faster shutter speeds – which will reduce the risk of blur caused by camera shake or subject movement – and it'll also create a shallow depth of field, throwing backgrounds out of focus and helping to ensure your subjects stand out. In low light, you may need to increase your ISO to 400, 800 or 1600 to obtain fast enough shutter speeds for sharp shots. Ensure speeds are fast enough for your focal length; such as 1/50 sec or higher for a 50mm lens, and so on.

Portrait shortcut #1

Shoot in Portrait mode

If you're in a hurry, choose the Portrait shooting mode. Your camera will set a wide aperture and Continuous Shooting mode to increase your chances of bagging a good shot, as well triggering the pop-up flash in low light. You'll only be able to capture JPEGs, so you won't have as much leeway to recover tonal information as a Raw file; however shooting JPEGs speeds up editing, and makes it quicker to print photos or share them on websites like Facebook.



Exposure 1/125 sec at f/4; ISO400
Lens Canon EF 50mm f/1.4 USM

Focus on success

Any photo needs to be correctly focused, but it's particularly important for portraits. Always focus on the person's face for a full-length or wider shot, or their eyes if you're shooting a close-up. Switch to manual AF point selection, and select the points around the edges to focus on the head or eyes, helping you position people off-centre for more engaging compositions. For most portraits you'll be fine using the standard One-Shot AF mode, but for fidgety kids or people on the move, try using AI Servo AF to track them if they're moving when you're shooting!

Exposure 1/60 sec at f/13: ISO100
Lens Canon EF 24-70mm f/2.8L USM

Mastering exposure

Cameras can underexpose light-skinned subjects due to their skin tones fooling the metering system, especially if their face is filling most of the frame. When you're shooting in Aperture Priority (Av) or Manual mode, you can quickly counteract this

problem on your Canon by dialling in around +1 stop of exposure compensation, to correctly expose your subjects and ensure bright and punchy portraits.

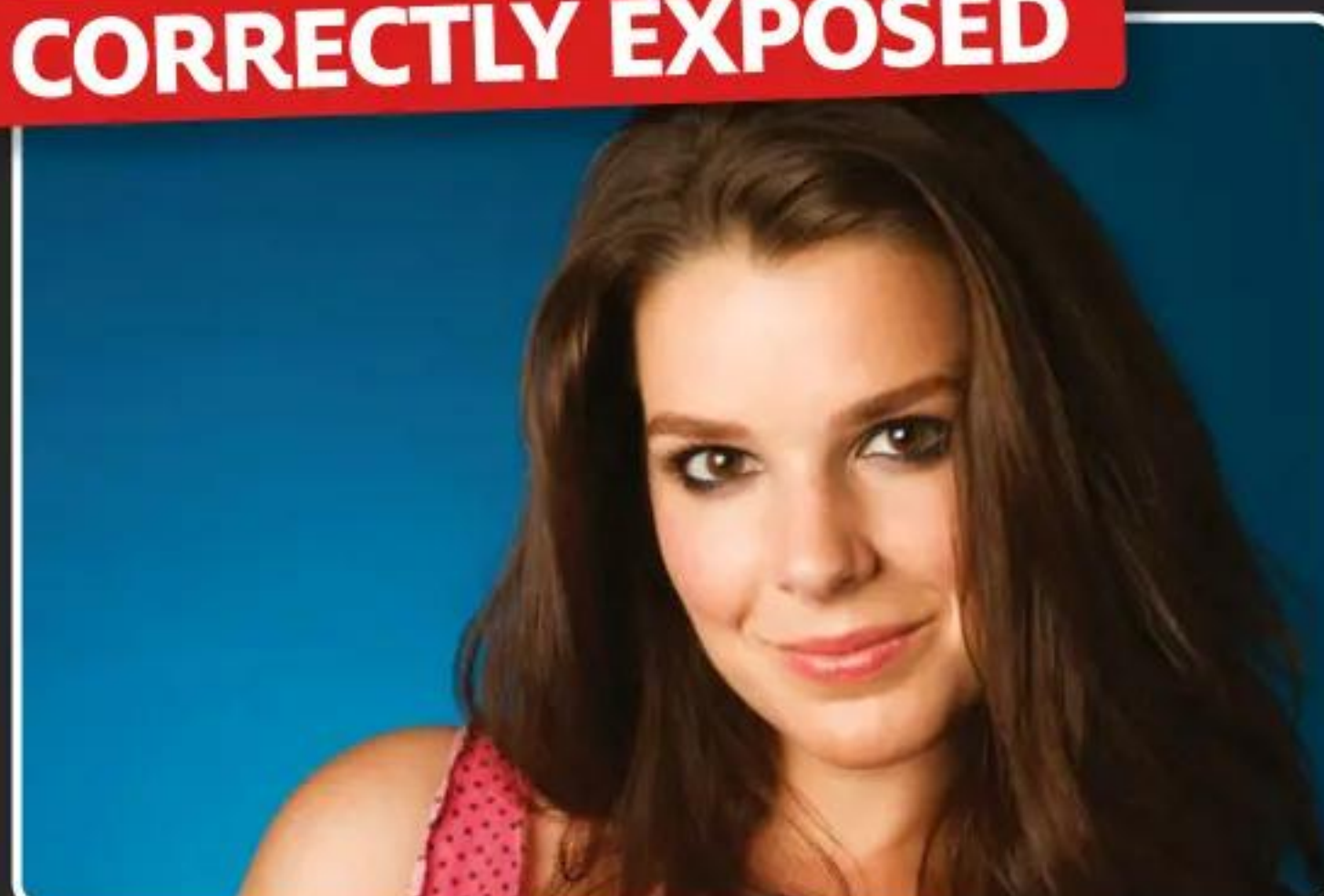
To avoid overexposure when using exposure compensation, set the display to

show the histogram when you're reviewing shots on the LCD, and check the highlights aren't 'clipped' off the edge of the graph. Turn on Highlight Alert; if detail is flashing on a subject's face, dial in 1/3 of a stop less compensation, and shoot again. ▶

OVEREXPOSED



CORRECTLY EXPOSED



UNDEREXPOSED



Light & colour

Why you should avoid shooting in the midday sun...

REFLECTED LIGHT

Fill those shadows

A reflector can turn dull people snaps into professional-looking portraits. You can use reflectors indoors or outdoors to direct soft light onto your subject's faces to fill in shadows and brighten up shots. Get somebody to hold the reflector out of shot, angling it to bounce the light back on them. Move the reflector further away to diffuse and soften the light. Different reflective surfaces offer different lighting effects – silver is very strong (so use with caution), gold warms people's skin up, and white is neutral.

NO REFLECTOR



Portrait shortcut #2

Automatic for the people

Photoshop has many Auto options to help you to instantly enhance your portraits. For Raw images, click Auto (just above the Exposure slider), while for JPEGs, try Auto Contrast (but avoid using Auto in Levels or Curves, as this can shift colours as well as brightness values), and use the preset styles when converting portraits to black and white. Even if the effect isn't perfect it can be a useful starting point, and you can then use the sliders in ACR, or adjustment layers in Photoshop, to fine-tune your shots. It also pays to polish your healing and cloning skills, as every portrait will benefit from having spots, blemishes and marks removed from under the eyes.

REFLECTOR



Exposure 1/320 sec at f/4; ISO400
Lens Sigma 70-200mm f/2.8 EX DG OS HSM



Inject colour for impact

The backdrop behind your photographic subjects will have a huge impact on your portraits, and will help to dictate the mood and tone of your photos. For more upbeat and striking portraits, look for colourful backgrounds such as garage doors, hedgerows and fences. Also bear in mind that the further your subject is from the background, the more you can knock this out of focus when using a focal length over 50mm and a wide (f/5.6 or less) aperture to draw them out of their surroundings.

Exposure 1/100 sec at f/7.1; ISO100
Lens Canon EF-S 17-55mm f/2.8 IS USM



Avoid direct sunlight

Beginners will often attempt to take portraits outside on sunny days, believing that the sunshine will brighten up their shots. Unfortunately, direct sunlight is a portrait photographer's worst enemy – especially the strong,

high midday sun – as it creates harsh, distracting shadows across people's faces, and the bright light also causes people to frown and squint. Either wait for some cloud cover to diffuse the light or head into a shaded area for squint-free,

shadowless portraits. Alternatively, use some 'fill flash' to light up the face and overpower shadows. If you're able to, shoot in the early morning or evening when the sun is lower and the light is softer and warmer.

DIRECT SUNLIGHT



FILL FLASH



CLOUD COVER



Flash light

If the light's not right, make your own!



Exposure 1/180 sec at f/11: ISO640
Lens Canon EF 70-200mm f/2.8L IS II USM

OFF-CAMERA FLASH

Invest in a flashgun!

Your Canon DSLR's pop-up flash can be helpful if you're shooting in low light; however, its power is low compared with a dedicated flashgun, and its fixed position is restrictive and can be unflattering to subjects. Invest in a flashgun and you'll have more power, plus you can angle the flash to

bounce off ceilings or walls for softer, more flattering lighting. For three-dimensional portraits with more depth and shadows, create a dynamic side-light by positioning your gun off to one side, fired remotely with a wireless flash trigger, or by your Canon EOS (see Portrait WShortcut #3, right).

DIRECT FLASH



DIFFUSED FLASH



Use a flash diffuser

Flashguns are better than pop-up flashes, but if you want to go one better, use a diffuser attachment to spread and soften the flashlight for more subtle shadows, smoother skin tones and altogether more flattering light. There are a few different types available, such as the Sto-Fen Omni-Bounce (£12/\$12) and LumiQuest or Lastolite softboxes (from around £50/\$80 upwards). Try before you buy to see which works best for your flash and style of portrait photography.



Portrait shortcut #3

Flashgun studio setup

High-end Canons, like the 70D and 7D, have built-in wireless flash control, so you can use your pop-up flash as a master unit, to wirelessly trigger Speedlites with a slave feature, for a simple and effective two-light portrait setup. You can easily set the power ratio between master and slave flashes from your camera.



Exposure 1/60 sec at f/6.3; ISO100
Lens Canon EF 50mm f/1.4 USM

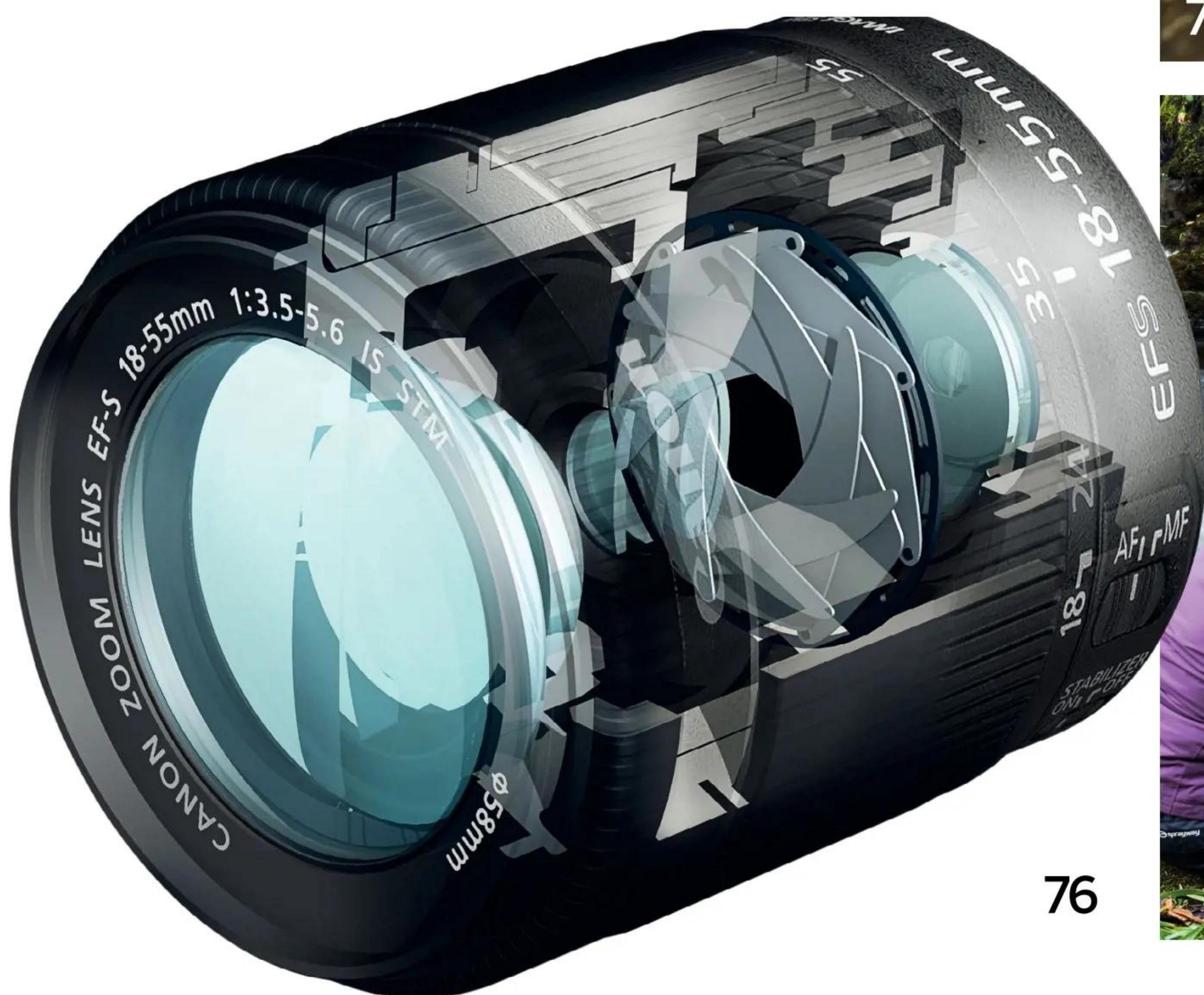
Studio lights

Give your portraits a professional look by using a set of studio lights. Basic two-head lighting kits, complete with stands and diffusers, are available from around £120/\$140 upwards. Shoot in manual mode, start off with an exposure of f/10 at 1/160 sec, ISO 100, then increase/decrease each light's power, or move them closer or further away from your subject to intensify or reduce their effect. Experiment with different lighting positions and power settings. Try using one flash head to light your subject from the front, and a second to backlight their head for a 'halo' effect and to add depth and lift them out of the background. Add a third head (if you can afford it) to light up the background.

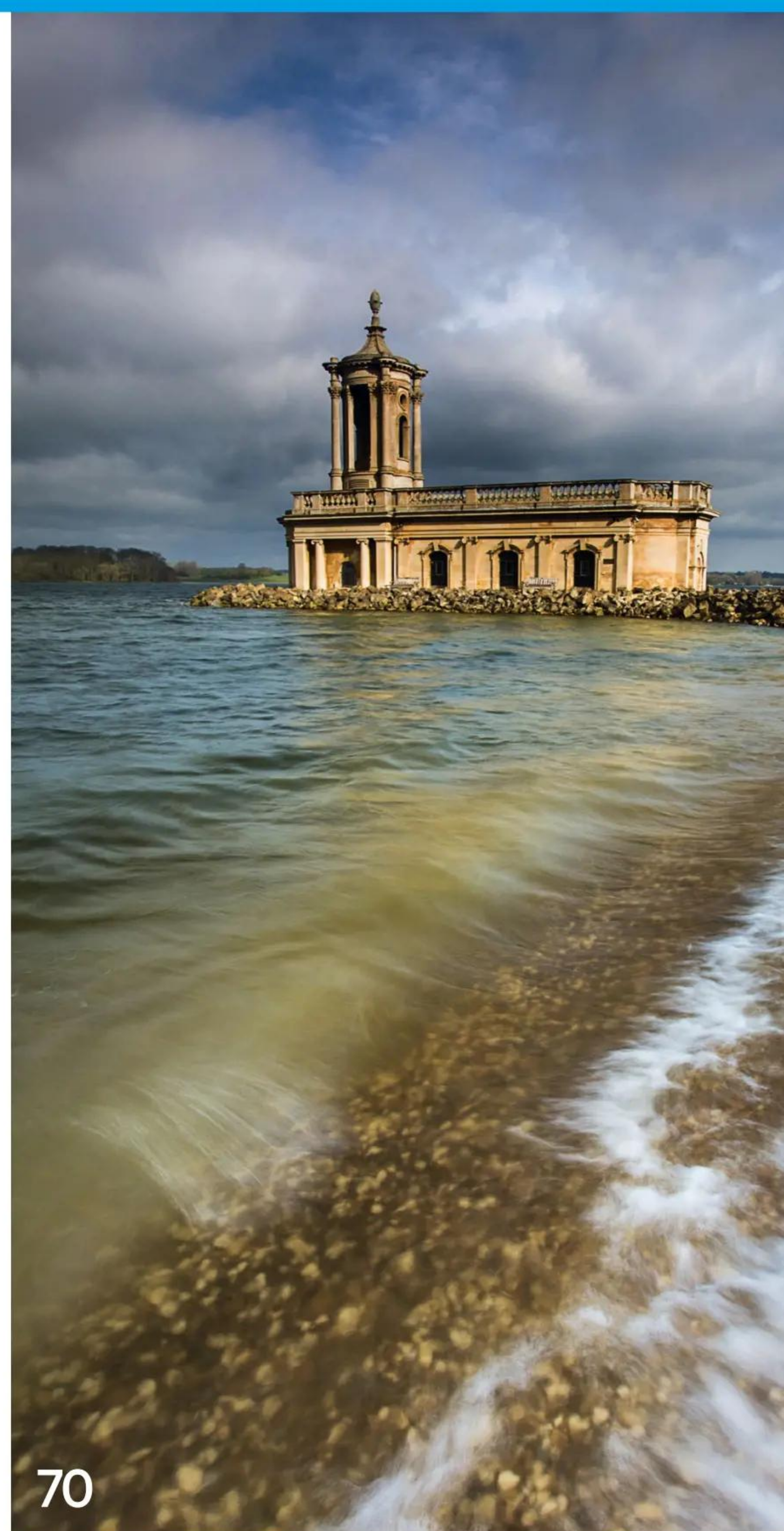


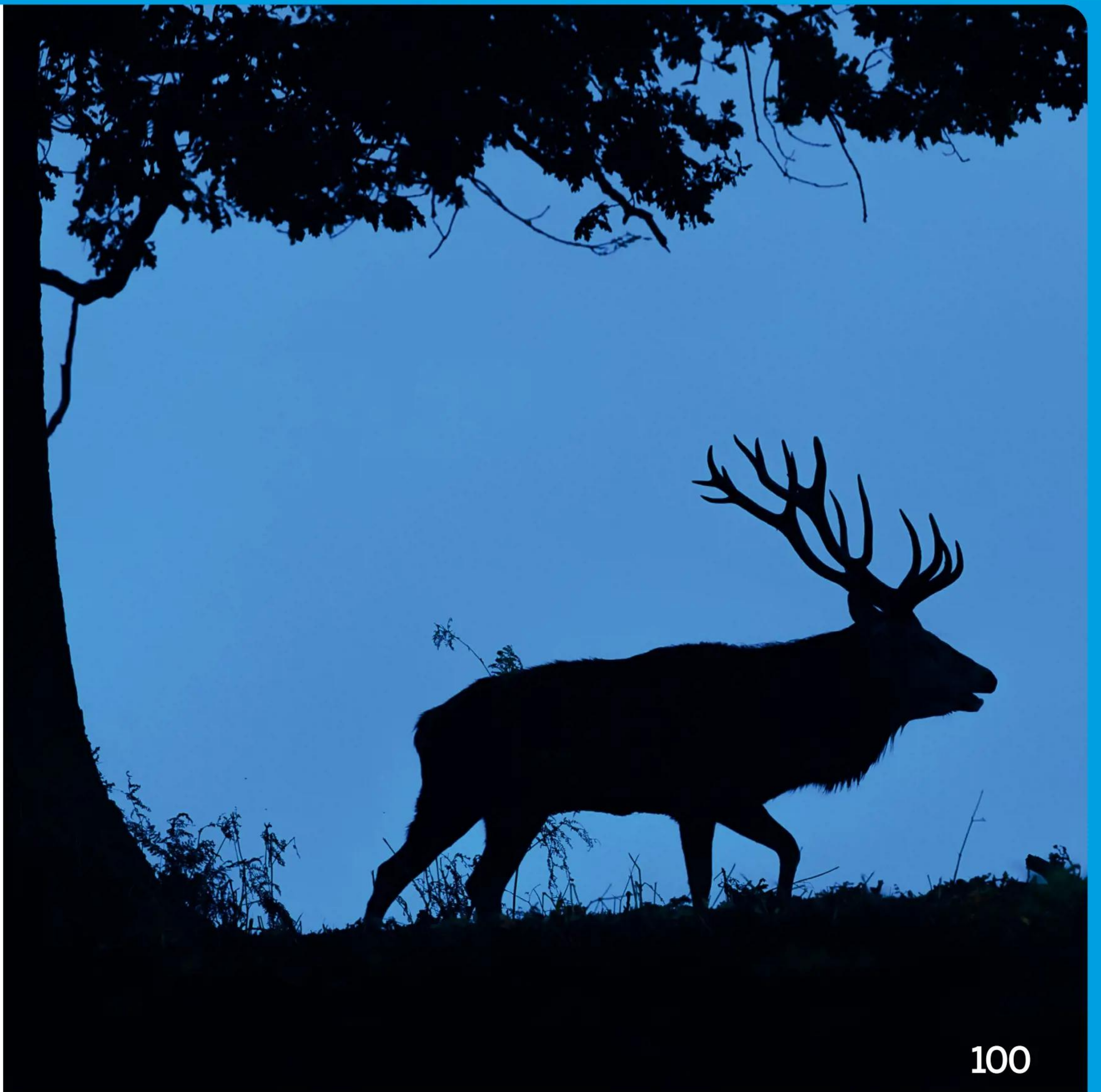
Canon school

Understanding exposure	64
How to handle your Canon	70
The importance of aperture	76
The need for shutter speed	82
Understanding ISO	88
In-camera metering	94
The importance of white balance	100
Awesome AF points	106



76





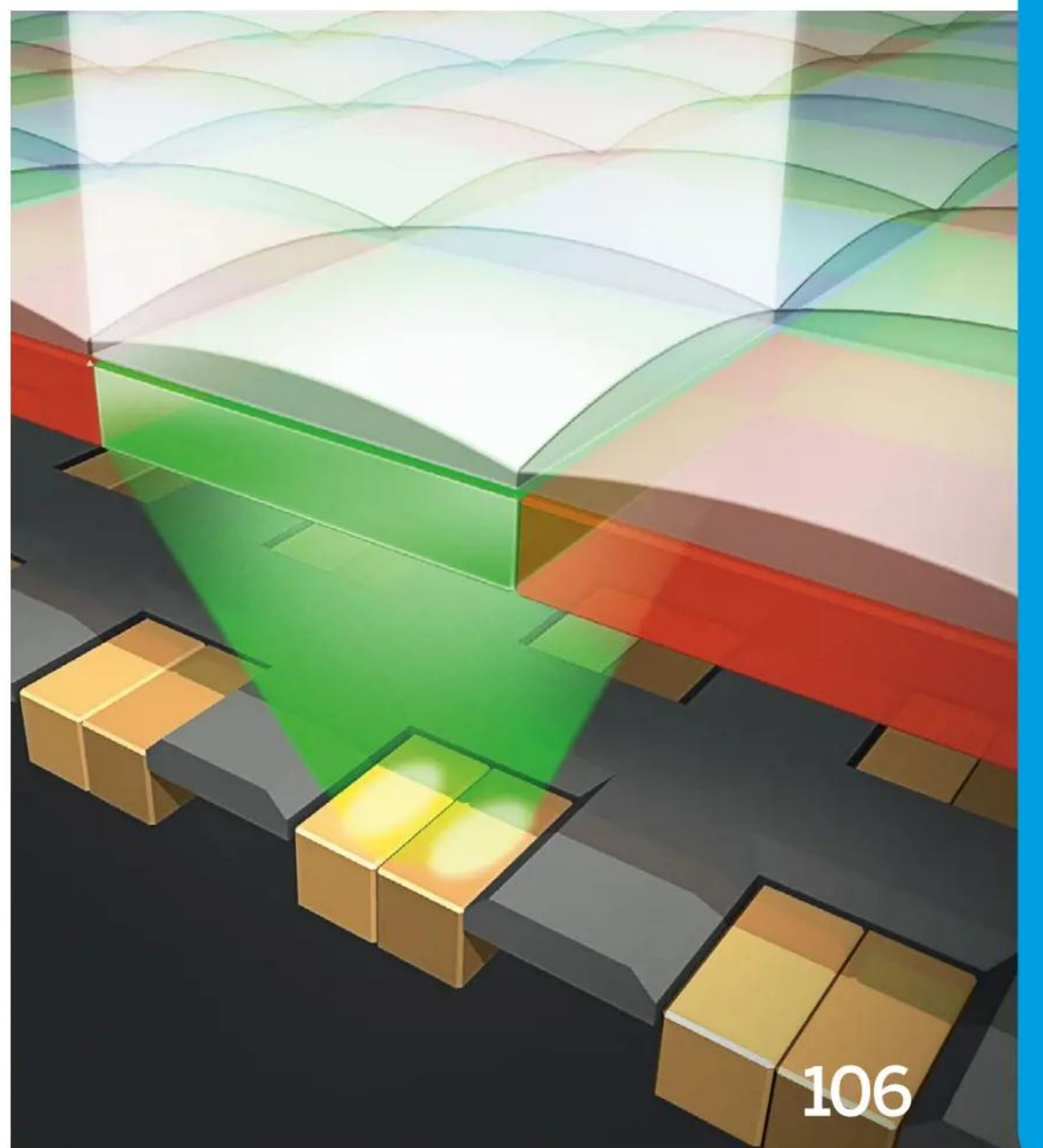
100



64



88



106

Understanding exposure

From conception to completion, we explain the fundamentals of taking a photograph

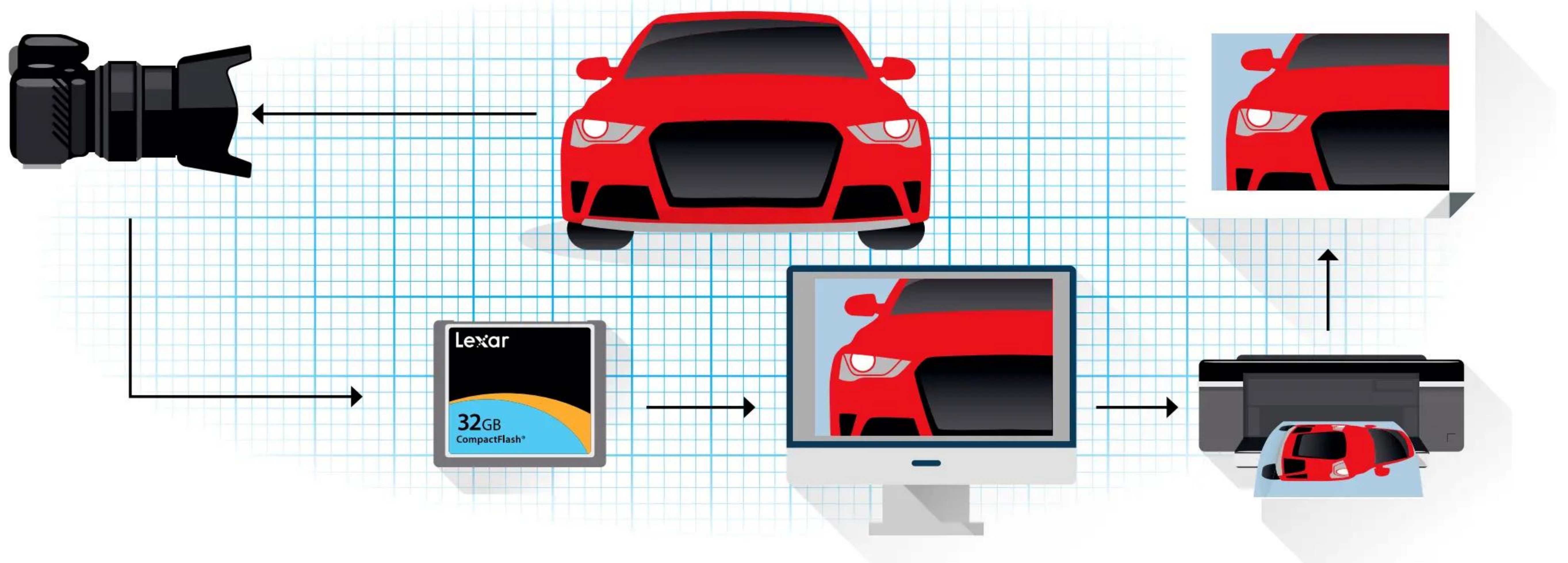
To kick-start this Canon School course, let's look at the most fundamental aspect of owning a DSLR – making an exposure. After all, this is what we photographers do time and again. We visualise an image, press the shutter button on our Canon DSLR,

the shutter opens to expose the digital sensor to light, and the image is recorded.

It sounds so simple when put like this, but exposure can frequently trip us up, and the more creative we want to get, the more complicated it appears to be. The fact is, if you master a few simple factors with your camera then

what seems unfathomably complex will suddenly appear as clear as spring water. It all revolves around what we've called 'the exposure triangle' – which includes three main elements: aperture, shutter speed and ISO. We'll get more into those settings over the page. For now, let's look at the picture-taking process.

It starts by light entering the camera and registering on the light-sensitive sensor at its heart. It is then stored on a memory card. The digital files are transferred from the card to a computer and finally, we hope, printed to create a wonderful photograph that can be framed and hung on the wall for all to enjoy.



CANON DSLR & LENS

Each relies on the other: the camera houses the sensor on which the exposure is captured, but the lens is needed to harness the light. By altering the size of the hole through which the light is passing you can change the look of your images by increasing or decreasing areas that appear sharp.

MEMORY CARD

The memory card is your digital film – and the bridge between camera and computer. All current entry and enthusiast-level Canon DSLRs take SD cards, though the 7D Mk II, 5D Mk IV and 5DS are also compatible with CompactFlash cards. However, the EOS 1D X takes CompactFlash only.

COMPUTER

Raw files are like digital negatives that first need processing, but the computer replaces the darkroom. You can use Canon's Digital Photo Professional, or opt for Raw software such as Adobe Lightroom or Adobe Camera Raw that's part of Photoshop CC/Elements.

PRINTERS

Replacing the high-street lab, online print companies are relatively cheap and easy to use for everything from a basic print to a cushion, or you can opt to print at home on a bespoke photo printer. Canon's PIXMA range of printers produce superb results, as do brands like printer-specialist Epson.

BASIC & CREATIVE ZONE

The Mode dial

Why moving from Basic Zone into Creative Zone will improve your photography

0 n the top of your EOS (unless you own a 1D X) is the Mode dial. This circular wheel gives you access to all the camera's exposure modes.

The automatic exposure modes are found in the 'Basic Zone', and are represented by pictorial symbols – a mountain for Landscape mode, a face for Portrait mode and so on. But

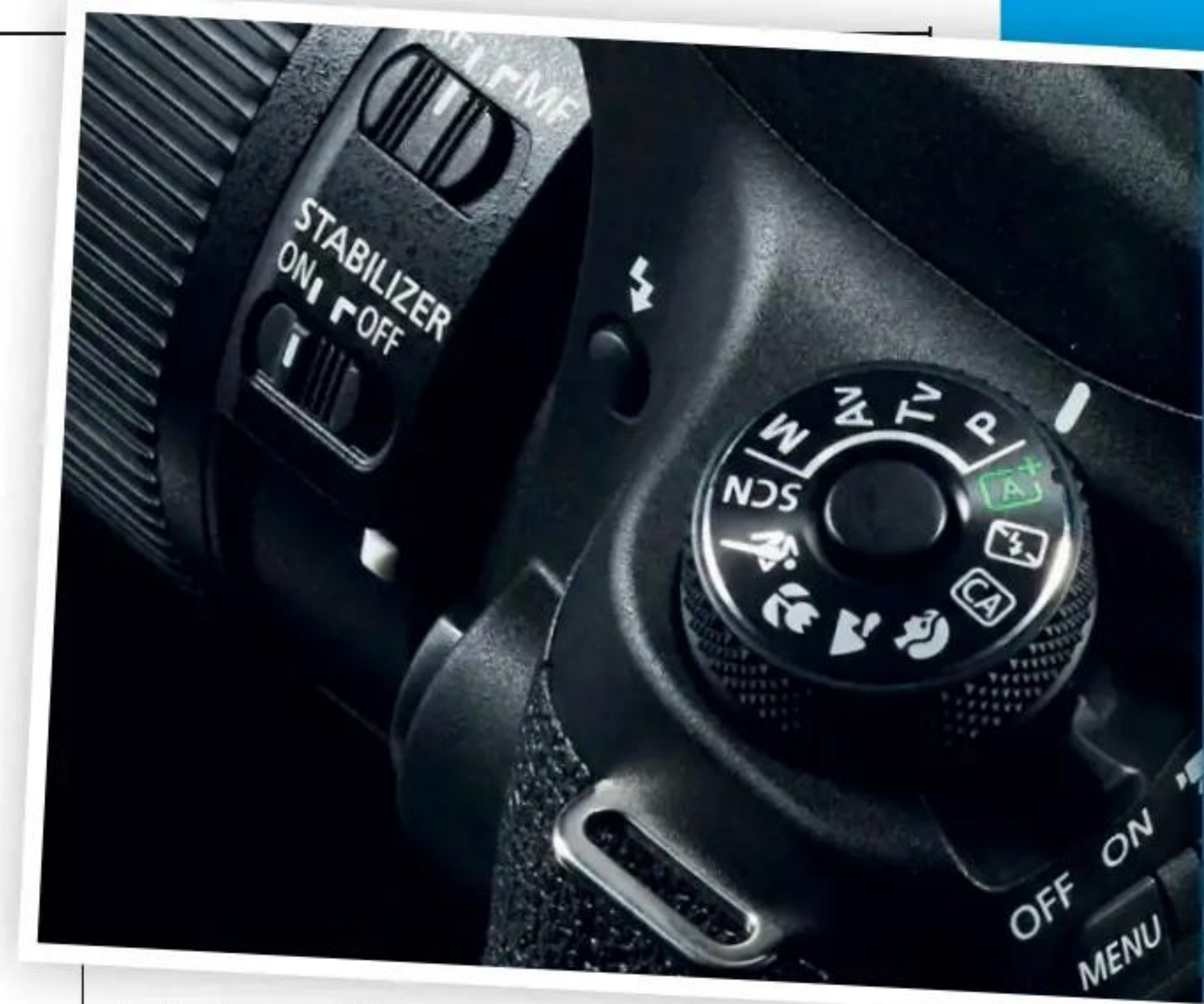
your only control is switching to each mode in the first place; after this the camera takes over, so what it decides is the 'correct' combination of aperture, shutter speed and ISO is what you get.

Switch to Sports mode, for example, and the camera judges the lighting conditions and comes up with an 'appropriate' fast shutter

speed for a moving subject, possibly pushing ISO higher to achieve it. It will also set the camera's AF mode to AI Servo, Drive mode to Continuous shooting, and make all AF points active, all of which help get a sharp shot of a moving subject.

So why would you want to work any other way? Well, your camera will have done an okay

job in getting an acceptable shot. But you could undoubtedly do better working in one of the semi-auto or full manual exposure modes, otherwise known as the Creative Zone...



Creative Zone

Take total control of your camera by selecting a semi-automatic – or full manual – exposure mode

CREATIVE ZONE MODES (M, Av, Tv and P) not only enable you to take partial or total control of the exposure, dialing in the shutter speed and/or aperture you desire, but also aspects such as ISO, Drive and AF settings, unavailable in Basic Zone modes. They're available on every EOS (on more advanced models, they're the only modes available). Here's an outline of the Creative Zone modes...

Manual (M)

In manual mode you physically set both the shutter speed and aperture. If you get either wrong it will adversely affect your exposure, so this is a setting to use only when you are 100% comfortable with how exposure works.

Aperture Priority (Av)

You choose the aperture and your DSLR selects the shutter speed. Av mode is good when you want to control depth of field, but watch the resultant shutter speed – you may need to increase ISO to boost this to avoid blurred shots.

Shutter priority (Tv)

You select the shutter speed and the camera attempts to set an aperture for a correct exposure. But look out for a 'blinking' aperture number – this means the exposure is beyond the aperture range, meaning under- or overexposed shots.

Program (P)

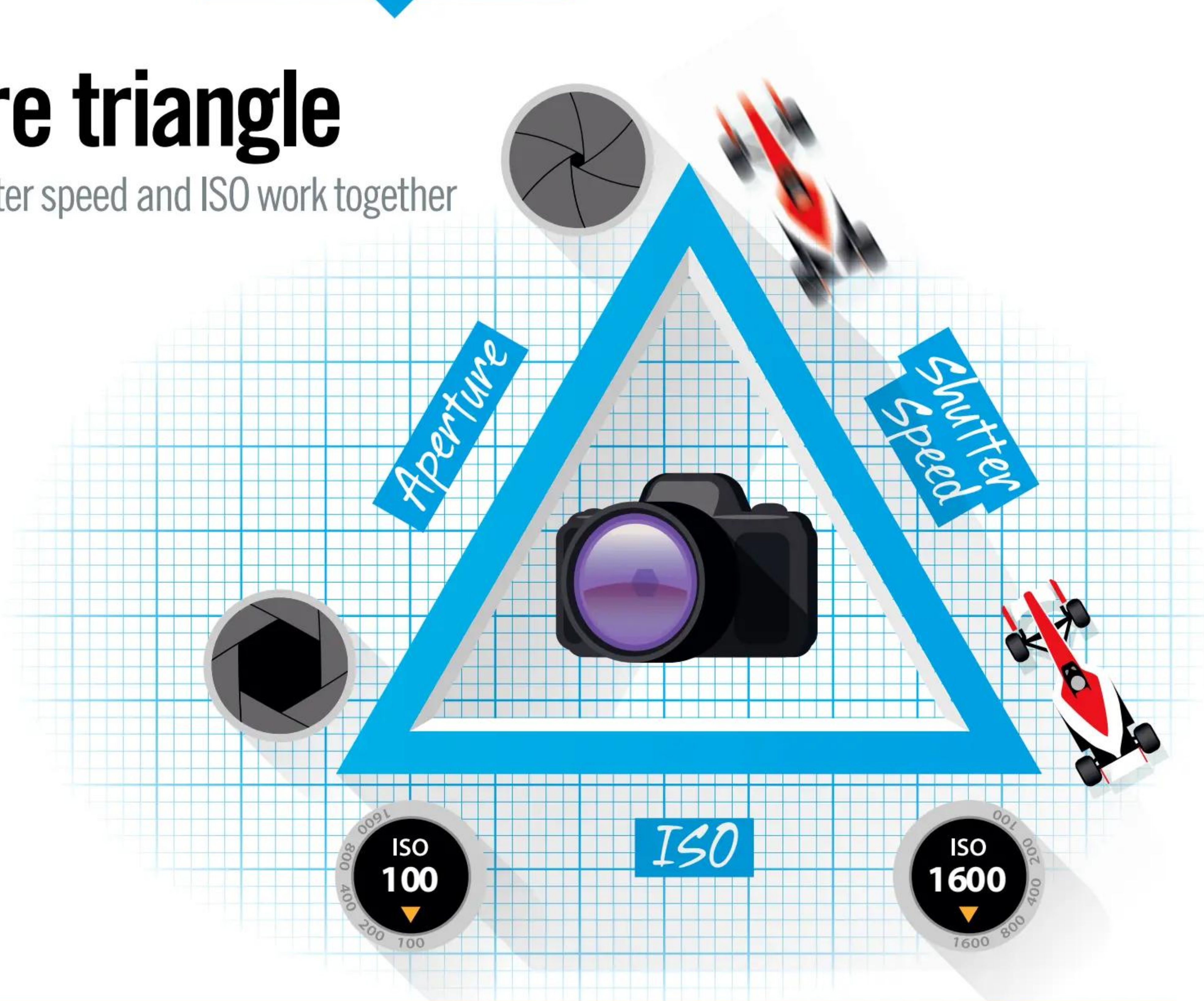
The camera sets both aperture and shutter speed. However, you can change the exposure for a wider aperture or faster shutter speed, for example, but both settings are changed in unison. You can also change ISO and focus modes.



The exposure triangle

Discover how aperture, shutter speed and ISO work together

To take the next step with your Canon photography, it's absolutely essential to understand the relationship between the three main elements that come together to make the exposure. One way of remembering the three key ingredients is the exposure triangle, with aperture, shutter speed and ISO on each of the three sides. Each decision you make in terms of aperture, shutter speed and ISO will have an affect on the look of your image. This is why it's creative! We will be covering each one of them in much greater detail in the future but here is a run through the basics...



Understanding exposure one stop at time

The key to creative photography is understanding how changing one side of the triangle affects the others



Aperture

AT ITS MOST basic the aperture is simply the hole through which light enters. Different aperture settings alter the size of the hole and let in more or less light. The aperture scale is measured in f-stops, but the logic can be rather baffling because it is an apparently random string of numbers that goes f/2.8, f/4, f/5.6, f/8, f/11, f/16. At its simplest level, the smaller the f-stop (f/2.8 or f/4) the larger the aperture and the more light that comes in. The greater the number (f/11 or f/16), the smaller the aperture and the less light comes in.

Shutter speed

THE SHUTTER SPEED is the time the shutter is open to allow light through to the sensor. So if the aperture is the hole through which the light is travelling, then shutter speed is the period for which that hole remains open. Shutter speed is also measured in stops, but is easier to understand because each f-stop is roughly double its neighbour, and is measured in seconds (more commonly, fractions of a second), and goes 1/8, 1/15, 1/30, 1/60, 1/125, 1/250 sec. The smaller the fraction, the faster the shutter speed.

ISO

THE ISO SETTING denotes the sensitivity of the camera's sensor. It, too, is measured in f-stops, and doubles as it moves along the scale – 100, 200, 400, 800 and so on. The beauty of the ISO setting on a digital camera is that it can be changed from shot to shot as conditions dictate – in the days of film you were stuck with a fixed sensitivity for the whole roll! When light levels are low you can increase ISO to lift shutter speed to avoid camera-shake issues, however, the higher the ISO, the more the image will be degraded by 'noise'.

Key to creativity

EVERY IMAGE TAKEN with a DSLR is an equation of aperture, shutter speed and ISO. They enjoy a reciprocal relationship and, for a given exposure, if you increase one element of the exposure triangle by one stop, then you will also have to decrease one of the other parameters by one stop. For example, if camera is set to 4 secs, f/16, ISO100, and you decide to reduce the aperture to f/22, you will also have to either increase the shutter speed to 8 secs or ISO to 200 to compensate.

EXP COMPENSATION

Making the shot lighter or darker

Learn when you'll need to take control of your exposures for the best results

When shooting in the semi-auto Av or Tv modes, the camera takes a meter reading of the scene then sets the other side of the exposure triangle for a 'standard exposure' to match your ISO setting. But

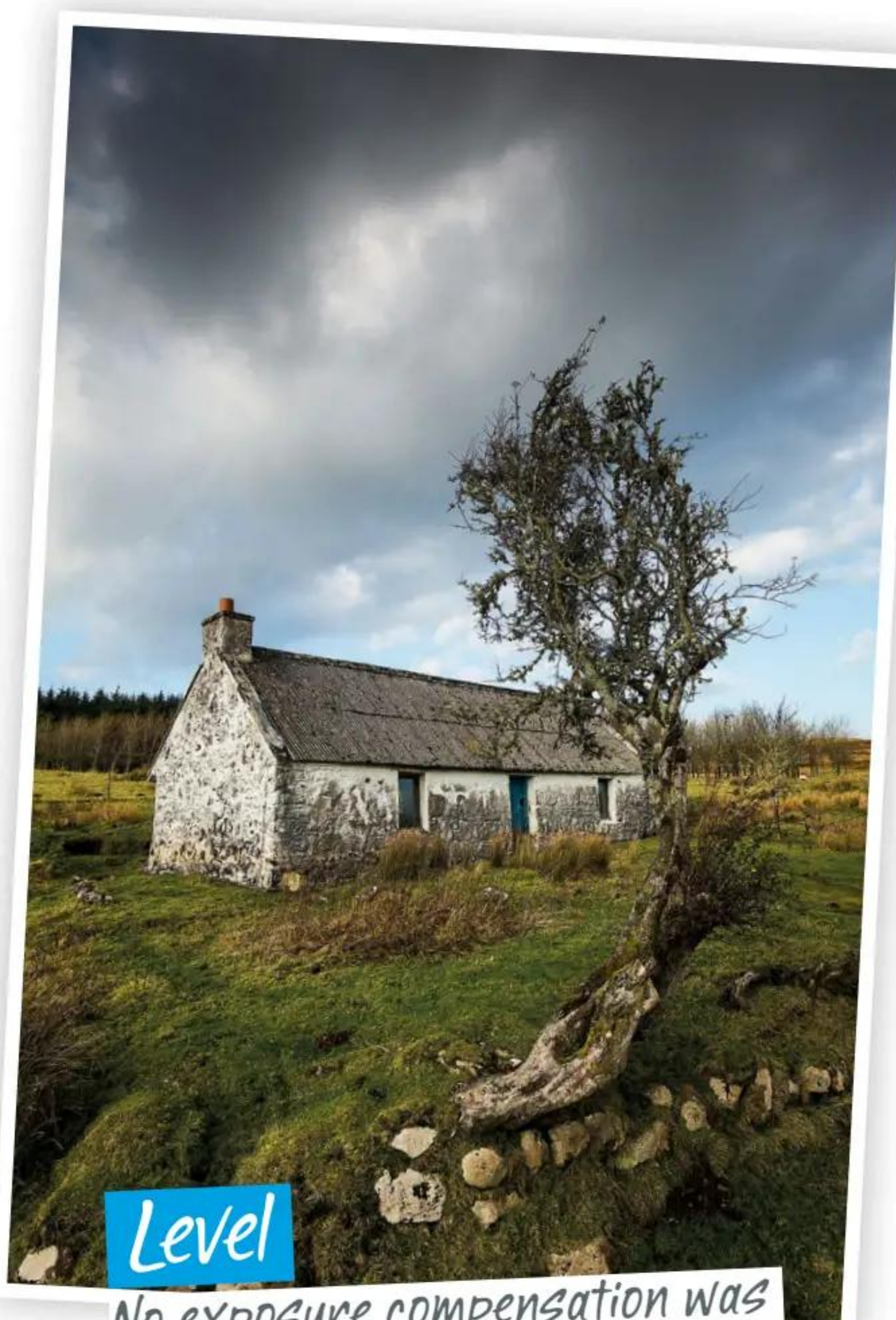
what the camera thinks is the perfect exposure might not yield the results you're after. For instance, when shooting a portrait with sun behind them the camera might expose for the brighter sky, plunging your subject into darkness. Or when

photographing a sunset, the camera will set an exposure for a balanced scene, rather than the dramatic silhouette you had in mind. To get around this, you can brighten or darken your photo using exposure compensation. Dialing in

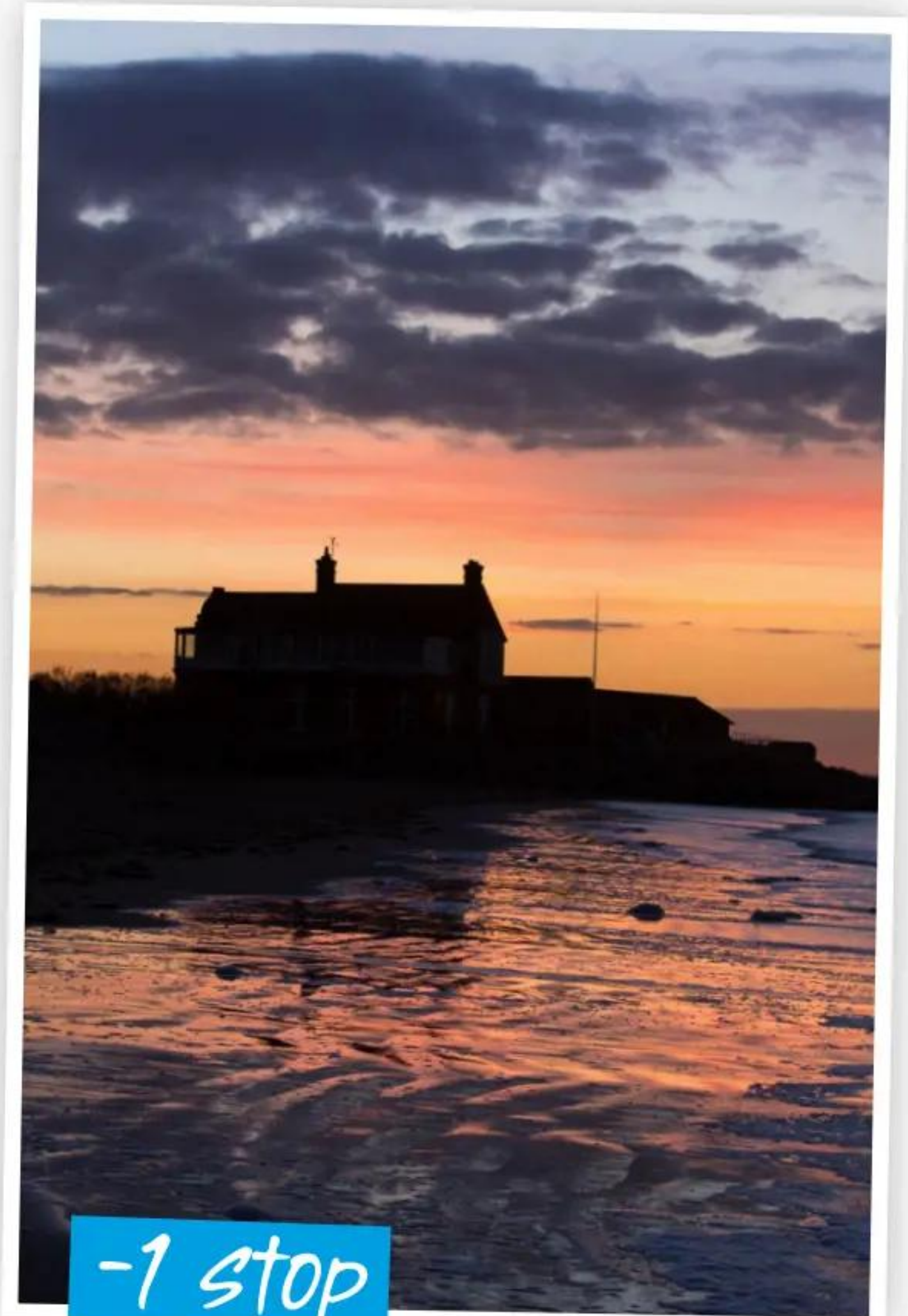
positive compensation brightens a shot, while negative compensation darkens it. Exposure compensation is also applied in 'stops' (usually thirds of a stop) and will improve your results when you're faced with challenging lighting conditions.

**+1 stop**

Manually brightening the exposure here as ensured the portrait subject's face isn't rendered too dark

**Level**

No exposure compensation was needed as this scene doesn't have high-contrast areas

**-1 stop**

Manually darkening this shot has made sure the sunset isn't bleached out

Picture styles

Apply in-camera processing to match your subject, from detail-rich landscapes to flattering portraits

JPEG images can have different 'picture style' parameters applied to them and, if you regularly shoot JPEGs to save yourself processing time, this is definitely worth exploring. For example, setting the Landscape picture style boosts the greens and blues in the image, and sharpens detail, while the Portrait picture style will accentuate skin tones and apply more moderate sharpening to keep complexions soft. You can further fine-tune the

Sharpness, Contrast, Saturation and Colour Tone settings of picture styles, and it's worth experimenting to get the look that you like. You can also create your own user-defined picture styles, or download them.

When shooting in Raw, the preview on your camera's LCD is, in fact, a JPEG, complete with picture style processing, but the actual Raw image data will be unaffected. For a closer rendition of the Raw image, set the Neutral or Faithful picture style.

**Neutral****Portrait**

The picture style has a big impact on your images – if you shoot JPEG. If you shoot Raw, you can change the picture style in DPP afterwards

Exposure assessment with histograms

Discover how the little graphs on your Canon DSLR's LCD can help progress your photography

When it comes to assessing an exposure, we've never had it so good. Not only do DSLRs give you the instant comfort of the LCD screen, they also have incredibly useful histogram graph. If you ignore histograms, then you're not using the assessment powers of your camera enough.

The brightness histogram is accessed by hitting the INFO button when you have an image displayed on the LCD. This graph is a representation of the combined red, green and blue tones that make up your image, running from 0 (pure black) on the left to 255 (pure white) on the right. The most important thing to avoid is 'clipping' the histogram, where

the tones in the graph are bunched flat at the left (underexposed) or pushed flat to the right (overexposed). If the graph is clipped either end, use exposure compensation to reign it in. If the histogram is clipped at both ends, then you need to judge whether it's most important to have some parts of the scene over- or underexposed.

Press the INFO button again to display the RGB histogram, which displays the spread of tones in the individual colour channels. However, the brightness histogram is generally the most useful.

Enabling the Highlight Alert warning provides a helpful indicator that your exposure needs looking at; overexposed areas flash black and white.

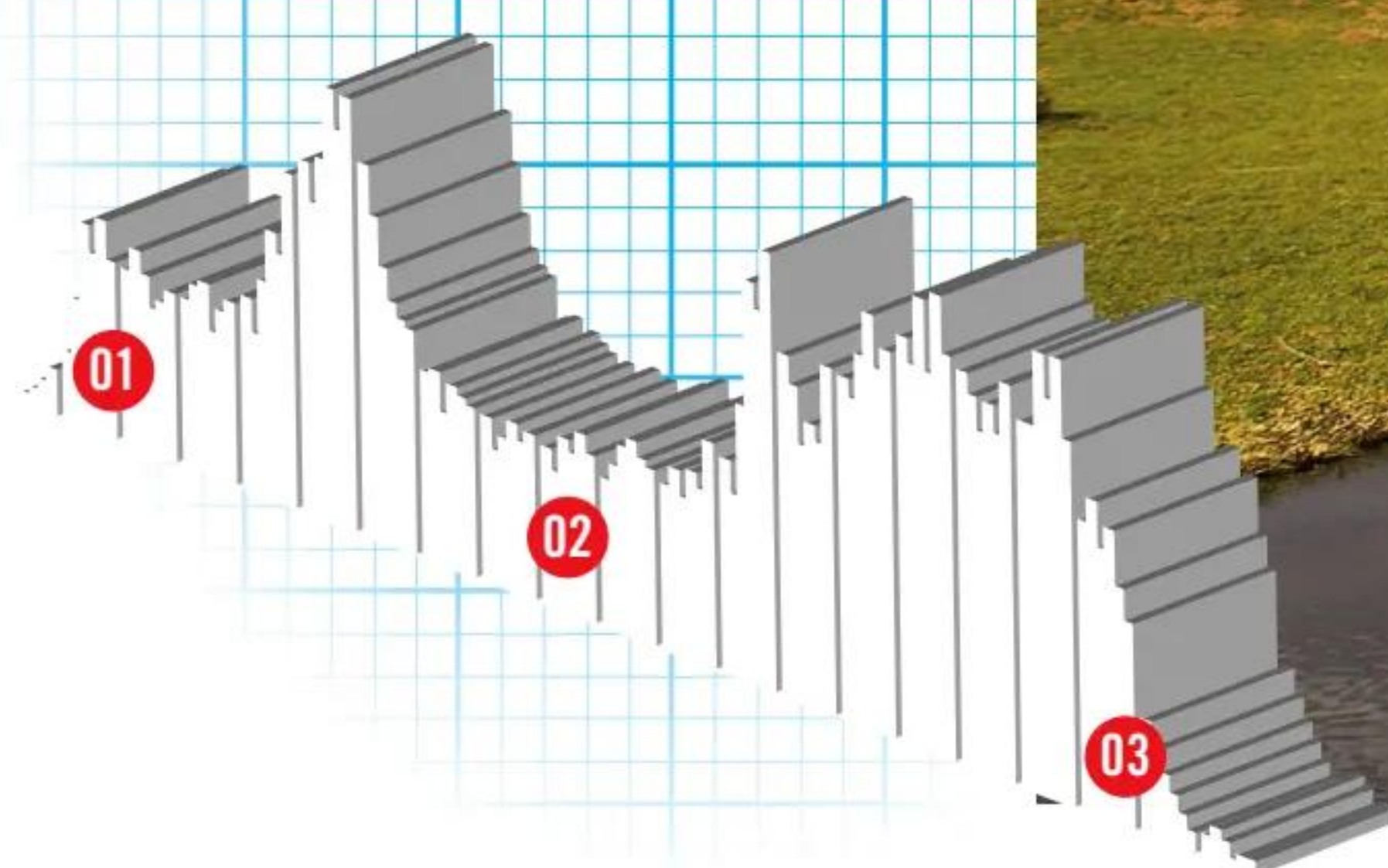
Histogram explanation

The histogram on your Canon's LCD shows the tonal range of your images across the graph like so...

Shadows: Left side

Midtones: Middle area

Highlights: Right side



Live View and Exposure Simulation

See your photo *before* you hit the shutter to take guesswork out of exposure

Canon DSLRs offer Live View shooting, and this can prove very useful when assessing exposure. Live View isn't suitable for every sort of photography, because it isn't as quick to focus on your subject, but where AF speed is less critical, such as when shooting landscapes, then Live View is an option to gauge exposure accuracy.

In Live View, your camera operates with the mirror flipped out of the way, and the image you see on the LCD is fed 'live' from the camera sensor, giving an accurate representation of the image that will be captured. Putting the camera in Live View and seeing how the scene lightens or darkens as you change elements of the exposure triangle

– shutter speed, aperture and ISO – is a really good exercise.

In some EOS DSLRs, such as the 5D Mk IV and 7D Mk II, you will need to enable Exposure Simulation via the menu for the LCD to show your exposure changes; if this is disabled then the screen will remain at a constant brightness, no matter how you alter



the exposure. You can also overlay the brightness histogram onto the Live View image. Simply press the INFO button until it appears on the screen.

CHOOSE YOUR SETTINGS

Decision-making when you shoot

Every shot is different. Here are the decisions we had to make when shooting two very different subjects. . .

Backlit dog (active)

Exposure details: 1/500 sec, f/4, ISO800

Conditions: Late evening, sun setting behind the subject.

Subject considerations: The subject is very active and we need to ensure the dog is pin-sharp in relatively low light. Handholding is our only option, because the dog is moving.

Settings: Switch to Tv, select a fast shutter speed of 1/500 sec and check the aperture chosen. But at f/4, our lens's widest available aperture, the aperture number is blinking, indicating the exposure will not be correct. So we push ISO up from 100 until it stops blinking; this is three stops higher, at ISO800. To ensure accurate focusing we switch AF to AI Servo and Drive mode to High-speed Continuous.



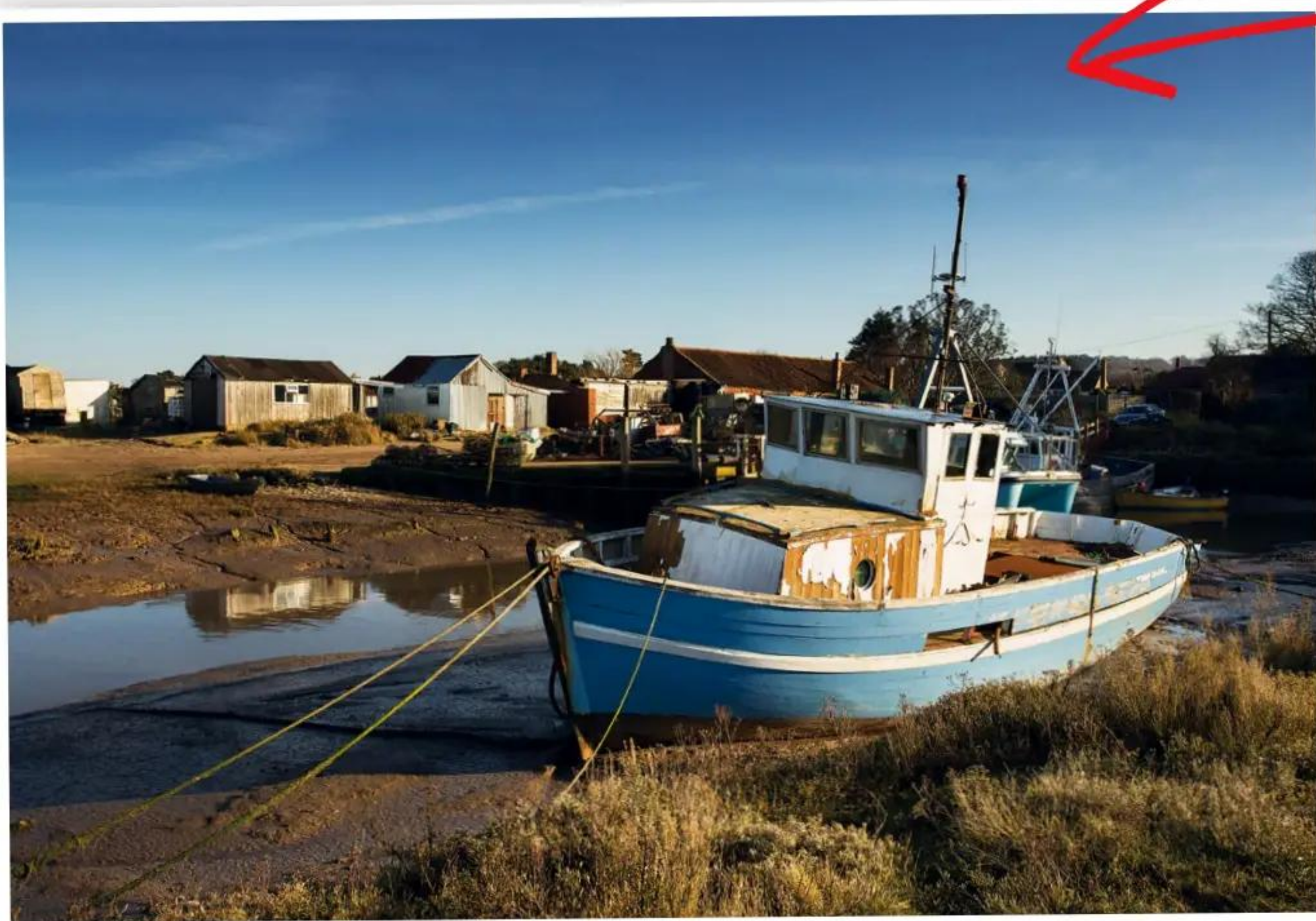
Landscape image (static)

Exposure details: 1/30 sec, f/16, ISO100

Conditions: Early evening sunlight falling onto the subject.

Subject considerations: The subject is static, so shutter speed is not the primary consideration here. However, we want to ensure plenty of depth of field.

Settings: Switch to Av mode and set aperture to f/16. We select the lowest ISO of 100 for maximum image quality; we then get a shutter speed of 1/30 sec. Handholding is not advisable at this speed so, to avoid shake, we put our DSLR on a tripod. For precise focusing we switch to Live View and focus manually, magnifying to 10x view to check sharpness.



School tip My Menu

Access often-used functions at super-quick speed

USING YOUR EOS camera's menu correctly is a good habit to get into because it means you can make important changes efficiently, leaving you free to concentrate on getting the shot. Furthermore, you can store functions that you regularly use in the My Menu option. Here, you can set up to six different functions that you want to have access to quickly and

they'll always be there, as long as you're operating in one of the Creative Zone modes. For example, if you are a landscape photographer and regularly want to enable or disable Mirror Lockup, register it to My Menu. Once you have your six most useful functions registered, you can even put them into a specific order to help you get to them even quicker.



How to handle your Canon

How to hold your EOS camera properly and get set sharper shots

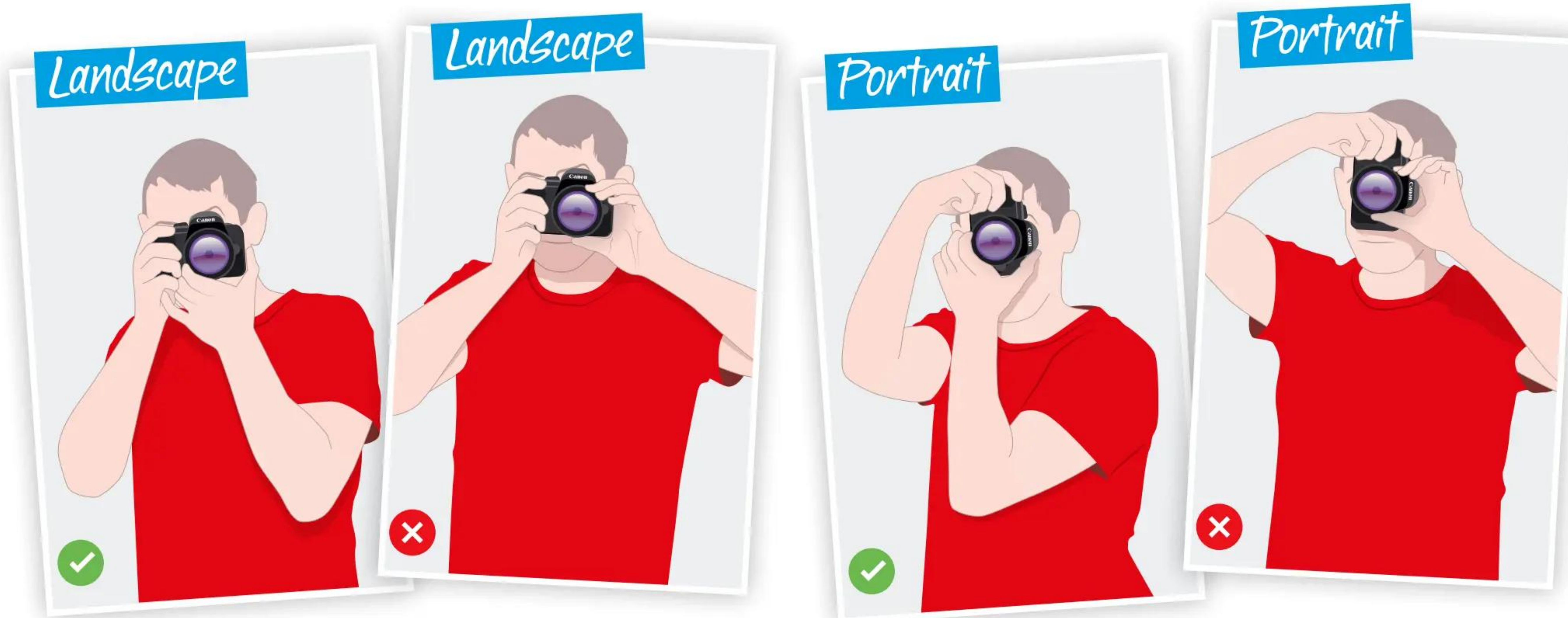
Basic handling is one of the most fundamental but often overlooked skills, but it's important to get right because poor technique will have a detrimental effect on your photography.

You must think about the position of your whole body, especially your arms and elbows, when taking a shot. When you get it right, you will take sharper photos simply because there is less chance of camera movement ruining a shot, particularly at slower

shutter speeds. Think of it as the image stabilization system that you don't have to pay anything for!

It's not always possible, or desirable, to use a tripod, so good handholding will make a difference to the number of shots you get acceptably sharp.

So even if you think you are holding your Canon perfectly, it's worth giving your handling technique a quick MOT. Take a look at yourself in the mirror with the camera to your eye; you might be surprised to find you have fallen into some bad handling habits!



Shooting in landscape orientation

HOLDING THE CAMERA for a horizontal (landscape) shot is the easiest to get right and the most frequently used. Your right hand needs a firm but relaxed hold on the camera grip, with your finger on the shutter button. Your right arm must be tucked in so the inside of the upper arm is flat against your body. Your left hand needs to support the camera and lens combination from underneath, again with your arm neatly tucked into the body. If using the viewfinder then lean forward slightly so the eyecup rests against your eyebrow. In this position you are a stable support system and can swivel to follow a subject, keeping the camera on the same axis all the time.

Shooting in portrait orientation

THERE WILL BE many times when you shoot vertically (portrait), but as soon as you do the camera feels awkward because it has been designed for use in landscape orientation, so the shutter button moves to a more difficult position. It feels wrong because you have to bend your wrist to reach it while trying your best to keep your elbow down. It is impossible to tuck your arm in completely so just keep it as neat and vertical as you can. One simple solution is to turn the camera around so that the shutter button is at the bottom rather than at the top; with the camera like this you can tuck both arms flat against your body again, so you have a more stable position to photograph from.

BASIC HANDLING

Get a grip

Improve comfort and camera control for upright shooting



Canon DSLRs (only built in on the 1D X) and it also increases the size and weight of your camera, but you don't have to use it all the time as it's easy to take off and put on, screwing into the tripod mount socket.

Canon make battery grips for most models and there are also plenty of third-party options available, too.

Battery grip



If you've tried holding your camera in the portrait position but still don't feel comfortable or stable then investing in a battery grip may be worthwhile. Not only will this give you increased shooting time if you use it with two batteries simultaneously, but more importantly it will make a big difference to handling when shooting vertically.

Not only does a battery grip have a shape that's easier to hold in portrait format, but

it positions a second shutter button on the top-front corner, exactly where your finger rests, so there is no wrist-bending required to reach it. Other controls are replicated on the battery grip, including AE Lock, AF point selection and the exposure compensation button. Overall, the use of a battery grip simply enables you to hold and shoot vertically much more comfortably and effectively.

It's an additional cost as a battery grip doesn't come

Over the shoulder shooting

How to steady your camera in low light situations

When light levels drop, fast shutter speeds become more difficult to achieve and this increases chances of camera shake. With a Canon camera and standard kit lens you have to be very wary of camera shake at shutter speeds below around

1/125 sec. Using image stabilization (if your lens has it) and bracing your body against anything solid, you can shoot at slower speeds with less risk of camera shake, but a lot will depend on how steady you are.

To compensate you can increase the ISO and open the

aperture on your lens as much as possible, but even then you may, in extreme situations, find yourself shooting at slower speeds than recommended. In these circumstances, one trick I use is to rest the camera on my left shoulder. I hunch my shoulder slightly to raise the viewfinder

to eye level then grip my right wrist with my left hand to form a solid unit. It makes for a steady position, even if it looks a bit odd!

But note that a moving subject will look blurred at slow shutter speeds, no matter how steadily you hold the camera.



Increase the ISO, open up the aperture and use the 'shoulder hold' when light levels are low

Shoulder hold



Using the electronic level

Activate the in-camera level display for straight horizons

Some tripods have built-in spirit levels, or you can buy slot-in hotshoe bubble levels to help you take a straight shot. However, more advanced EOS models have an in-camera electronic level display that can be called to your assistance.

Press the INFO button twice and it appears on the rear LCD. A red line indicates the camera

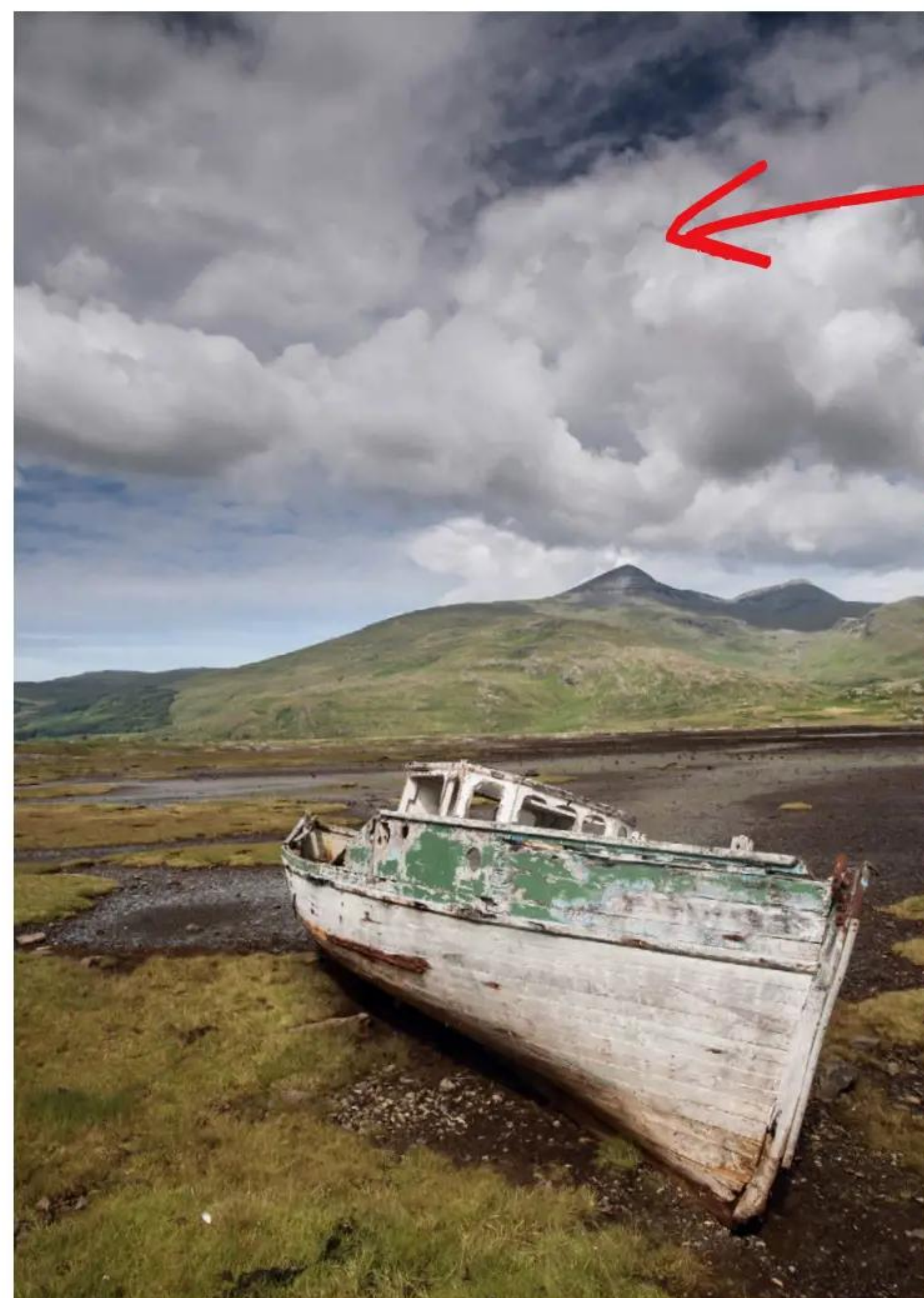
is not level and the markings within the grey central circle tell you by how much, as each one shows a 1° variation. By tilting the camera's position fractionally, until the red line turns green, you can be certain your image is level.

Using this while handholding the camera isn't ideal because you have to take your eye away from the viewfinder to look at

the LCD. It's better to use this in conjunction with a tripod; once you have a green line you can lock the tripod knowing everything is correctly aligned.

The new EOS 7D Mark II offers an electronic level display in the viewfinder itself – this is a different display to the electronic level on the back LCD, and once enabled you

can keep it visible in the viewfinder the whole time, making it much easier to know when your shot is level when shooting handheld because you don't have to move the eye away from the viewfinder.



Not level

An otherwise well-composed shot is spoiled by an uneven horizon that's off-kilter by just 2°; fixing this in Photoshop would lose vital picture info at the edges

Level

Here, composition was sorted with the camera on a tripod and the electronic level activated as a final check to ensure the horizon was perfectly straight



The hidden viewfinder level

Activate a viewfinder level in 5D Mark III and 1D X

You can access a viewfinder level on the 5D Mark III and 1D X, using the squares normally used for AF, but it's not the most intuitive system. Go to Custom Controls and assign one of the available buttons to it. If you don't use the DoF preview button much, you can reassign it to activate the electronic level.



Level with Live View

IT'S ALSO POSSIBLE to use the electronic level in Live View mode. Simply press INFO a few times and it will appear at the centre of the screen, overlaid on the live image. Although it is reduced in size for Live View, it still gets in the way when you are working out image composition, so it's best used as a final double-check that your horizon is absolutely level when you're relatively happy with your framing, then turn it off.

Level no show?

IF YOU ARE an owner of a Canon camera that has an electronic level (which includes almost every enthusiast and pro EOS camera) but it doesn't show up when you press the INFO button twice, make sure it is activated by going into the Settings menu (with a spanner symbol) and scrolling through until you find the 'INFO button display options'. Select this and ensure Electronic Level is ticked.

FULL-FRAME vs APS-C

Sensor size and the crop factor

Understand the difference the dimensions of your camera's sensor makes

At the heart of your **Canon EOS DSLR or EOS R mirrorless camera lies either an APS-C or full-frame CMOS sensor.**

Most entry-level and enthusiast cameras, like the 90D, 7D Mark II or R7, have an APS-C sensor – the term is derived from 'APS

Classic' film, which is close in dimensions to APS-C sized sensors, at 22.2x14.8mm.

This is considerably smaller than the full-frame sensors found in high-end cameras, such as the 5D Mark IV or R5, or R1 and 1D X. It's called 'full-frame' because it shares

the same dimensions as a traditional 35mm film negative; 36x24mm.

The smaller size of APS-C has one major effect on your photography – crop factor. The focal length of lens is magnified by a factor of 1.6x; so a 35mm lens effectively becomes a

56mm lens. The crop factor is good news if you want extra reach on long lenses for sports or wildlife, but not so good when it comes to shooting big scenes; although there are plenty of ultra-wide APS-C lenses that will enable you to capture large landscapes.



Crop factor

There is quite a large size difference between full-frame and APS-C sensors, so for a landscape image you will need a wider lens on an APS-C camera to capture the same area as a full-frame camera



EF vs EF-S

Which lens for crop cameras?

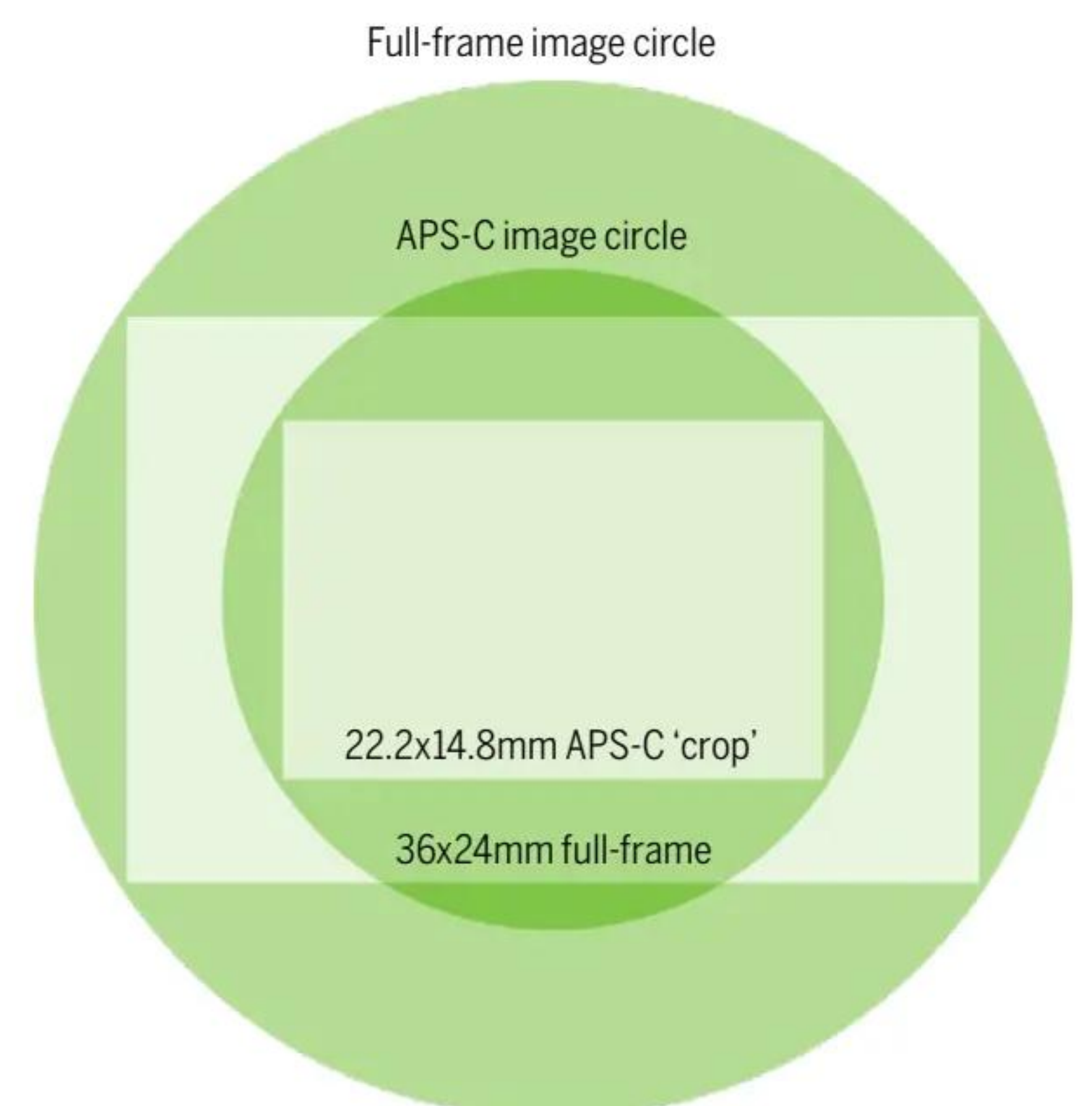
Canon has developed a range of EF-S lenses specifically for APS-C sized cameras. They are generally smaller and lighter than comparable focal length full-frame (or EF) lenses, as they produce a smaller image circle. Full-frame cameras cannot use EF-S lenses because, not only would an image taken with them be compromised by the size of the smaller image circle, but it could potentially damage the mirror as the lens sits further back into the body. You can, however, safely use EF lenses on APS-C bodies.



Canon EF-S
18-55mm
f/3.5-5.6 IS STM



Canon EF
24-70mm f/2.8L
II USM



Another dimension

Try using the alternative crops on your camera

A spect ratio is simply the width relative to the height of an image. The default aspect ratio of all Canon DSLRs is 3:2, so if you shoot with the camera set to this you will be using all the sensor's size, no matter how many megapixels your EOS has, or whether you have a full-frame camera or one with an APS-C sensor.

But, of course, images are often cropped to all sorts of different aspect ratios – 1:1, 3:1, 4:3, and 5:4, for example. In the days before digital, these crops would be native to the type of camera and film being used, but with a

Canon DSLR, you can do this in-camera. Go into the menu, select Aspect Ratio, and choose from the list and press SET. The camera will now crop your image to the chosen ratio.

When you look through the viewfinder, however, you will still see the full-sized image, without the crop, so it's no aid to composition. But if you switch to Live View then you will see your chosen ratio, with the area around the selected crop blacked out.

Generally, though, it's best to stick to the default 3:2 aspect ratio for most of what you do and, if you choose to, crop later in post-production.



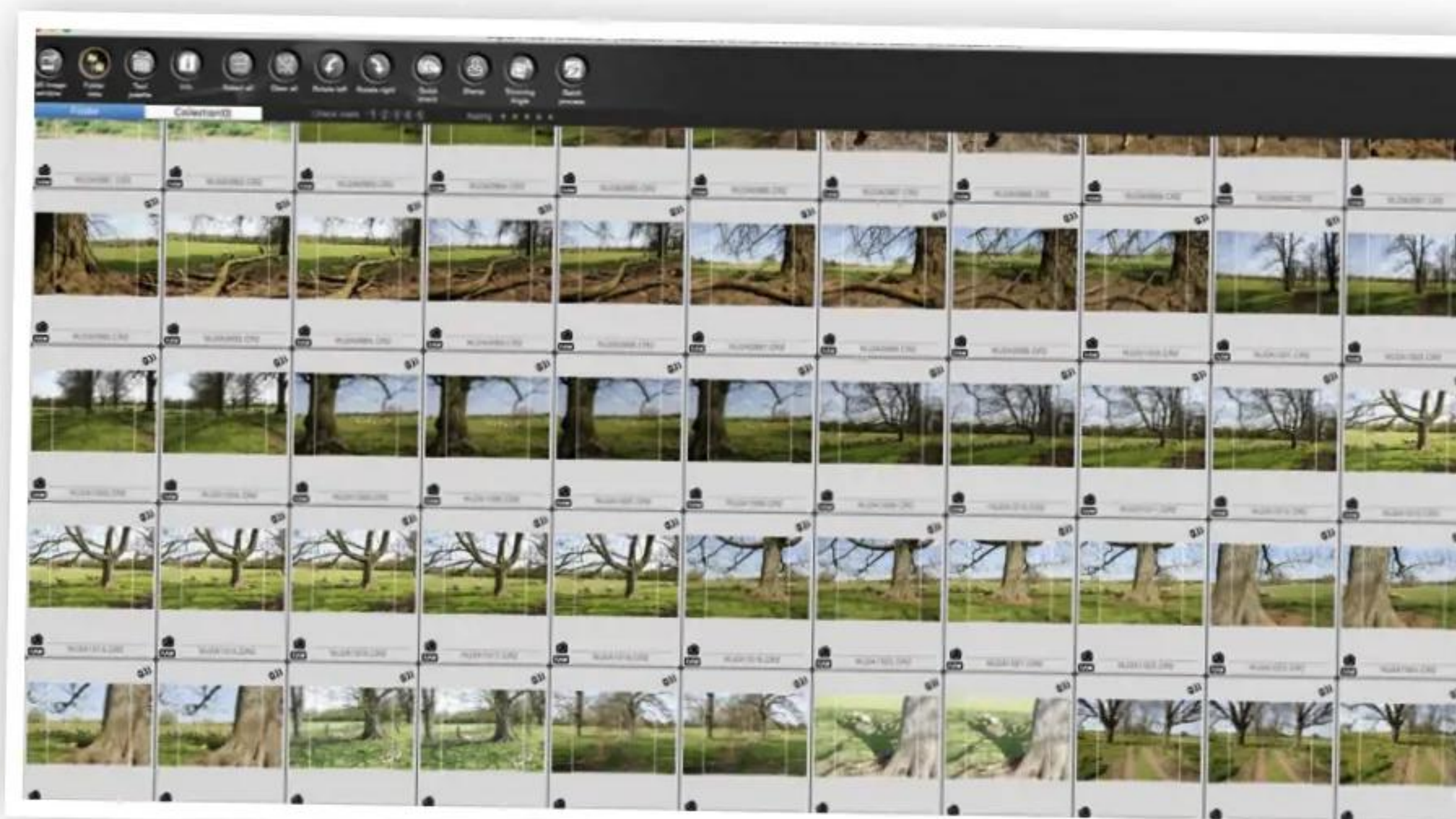
Aspect ratio and Raw

Un-crop your image with DPP software

If you are shooting in JPEG quality mode then the camera will crop the file to the selected ratio, and there is no getting back to the default 3:2 aspect ratio if you later change your mind on the crop.

However, if you shoot Raw and process it in Canon's own Digital Photo Professional software, when you open the Raw file thumbnail view

you'll see the normal 3:2 file with the ratio you selected overlaid on it. Open up a Raw file and it will be cropped to the ratio you selected, but you can then override this and return to the default 3:2 ratio by selecting Tools> Start Trimming/Angle Adjustment from the menu bar at the top and, in the window that opens, clicking the Clear button.



Even if you select a different aspect ratio in-camera, Raw images retain the full 3:2 image; DPP shows the cropped area as an overlay

GRID DISPLAY

Follow the guidelines

Enable grid overlays to help with your compositions

One other tool at your disposal, that can help with both composition and avoiding wonky horizons, is the **Grid Display function**. It's available in many Canon EOS DSLRs, although with some models there are fewer grid options and it may only be visible when using Live View.

For example, the EOS 700D gives just two Grid Display options – 3x3 and 6x4. Once selected you can't see them through the viewfinder and will have to use Live View in order to be able to view them overlaid on the LCD screen.

However, some more advanced Canon cameras, such as the 70D, 5D Mark III, 5DS, 7D Mark II and 1D X, can be configured so the grid is seen when looking through the viewfinder. To do this, go to 'VF grid display' in the Shooting menu to enable it. Now, whichever grid you choose, it will be shown in the viewfinder or when you select Live View.

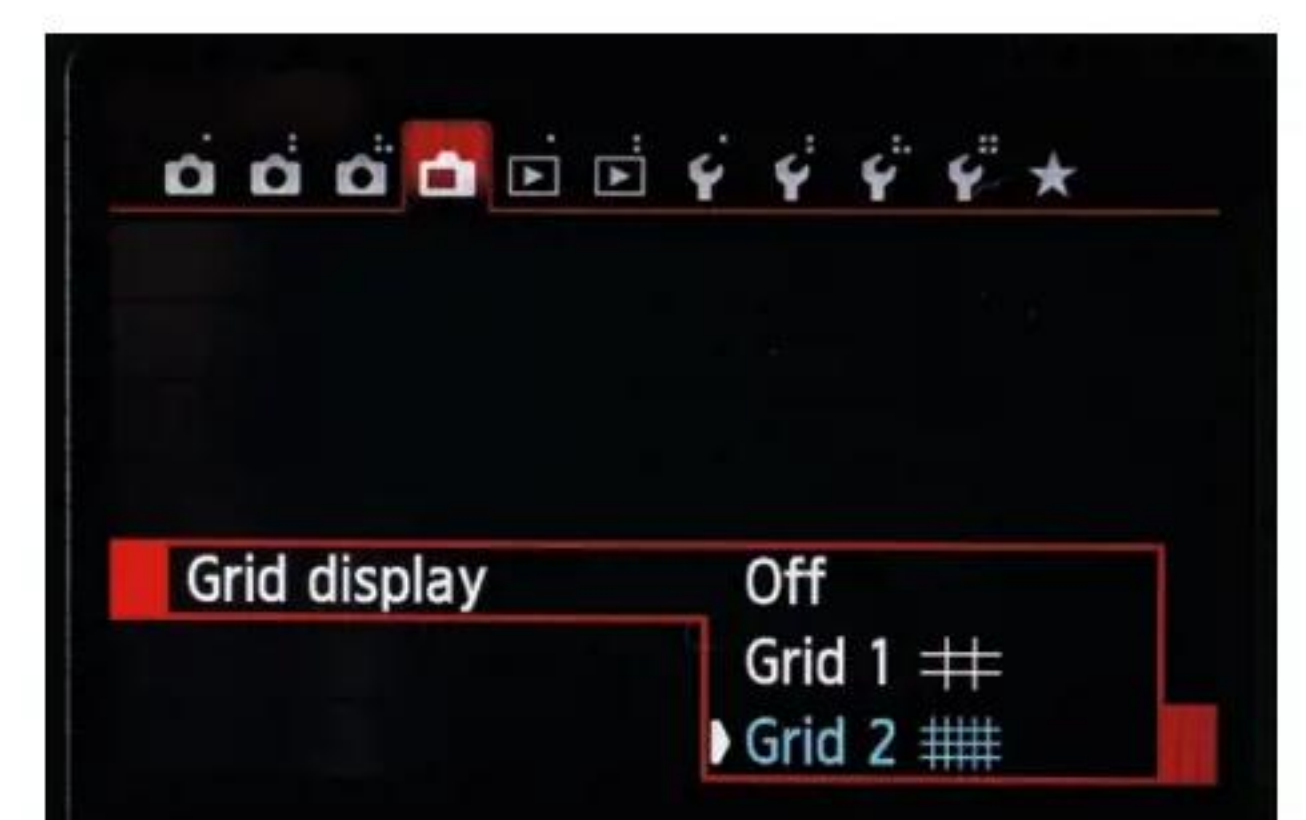
Of all the Grid Display options available, the 3x3 view is probably the most useful as it can be used to help with many compositions because it conforms approximately to the rule of thirds. However, all the

grids can be useful for checking that horizons or verticals in building are level, by lining a feature up with one of the gridlines.

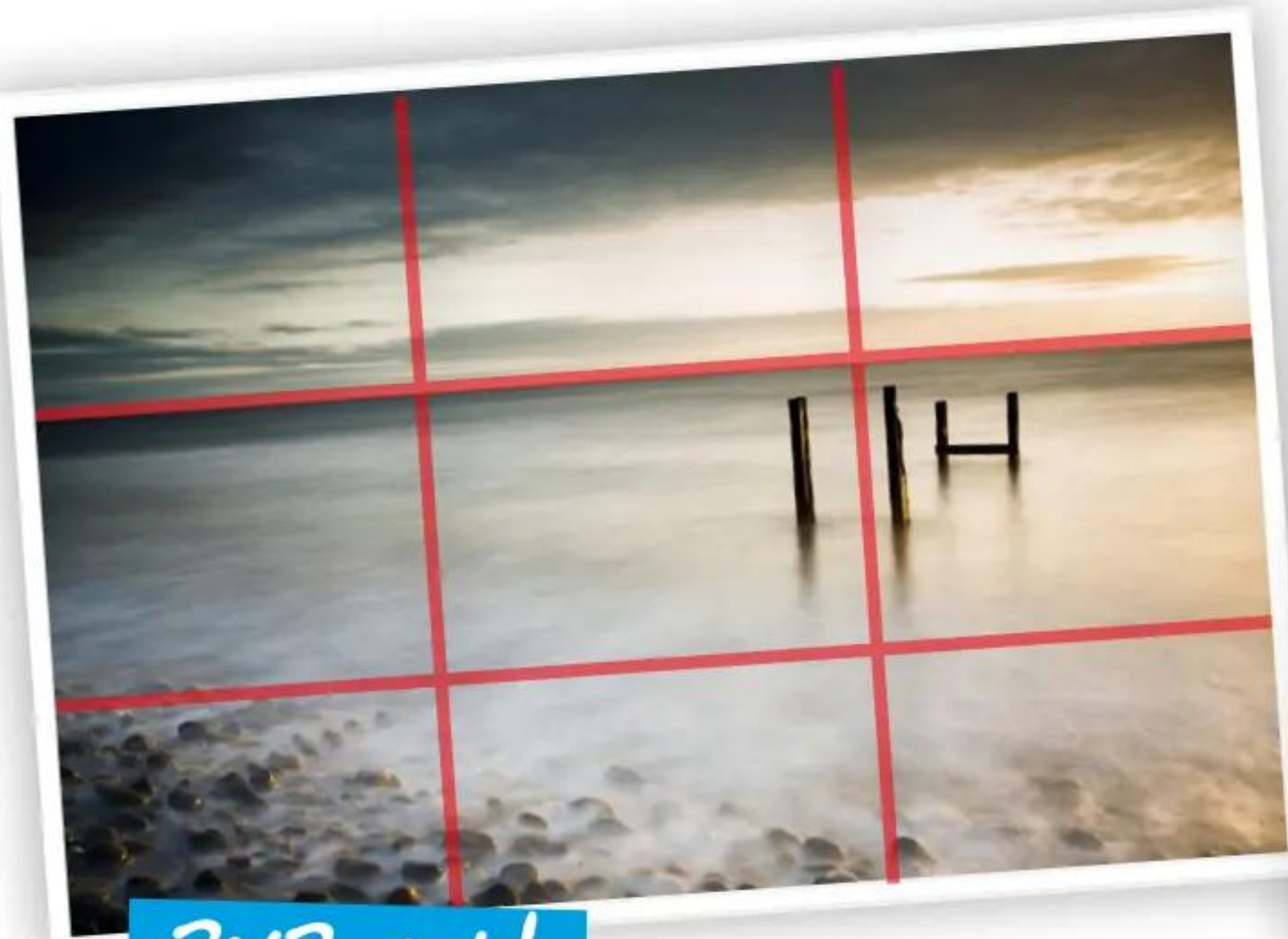
There is also a 3x3 grid with added diagonals across the intersecting points for extra compositional assistance, such as following leading lines. But it's important to remember that any Grid Display you choose is just for guidance, and you shouldn't stick rigidly to one specific way of framing shots, or your photos will lack originality. If you activate a grid but feel it is distracting then simply switch it off.



High-end cameras can show the Grid Display in the viewfinder

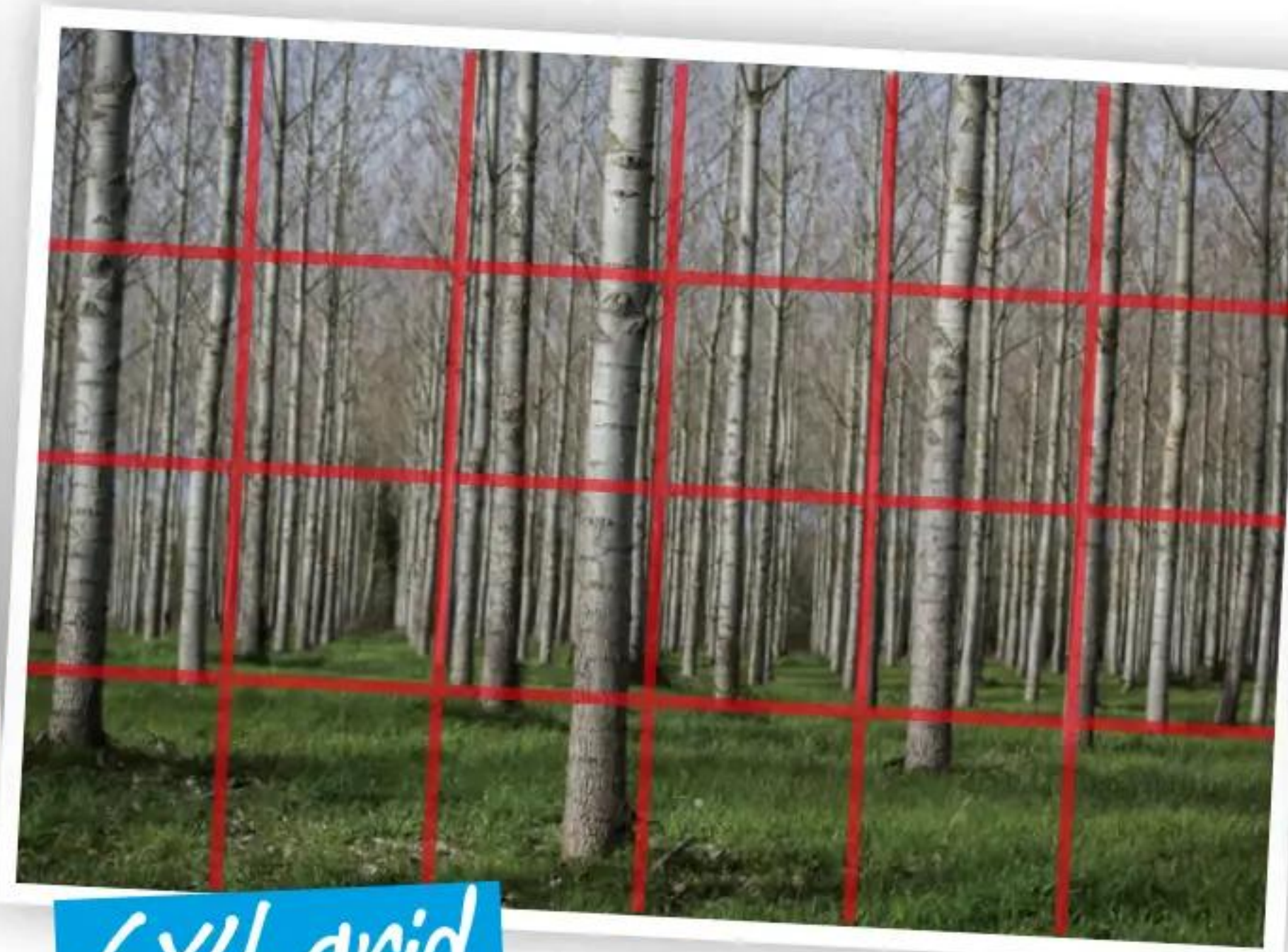


Entry-level models have fewer options, only available in Live View



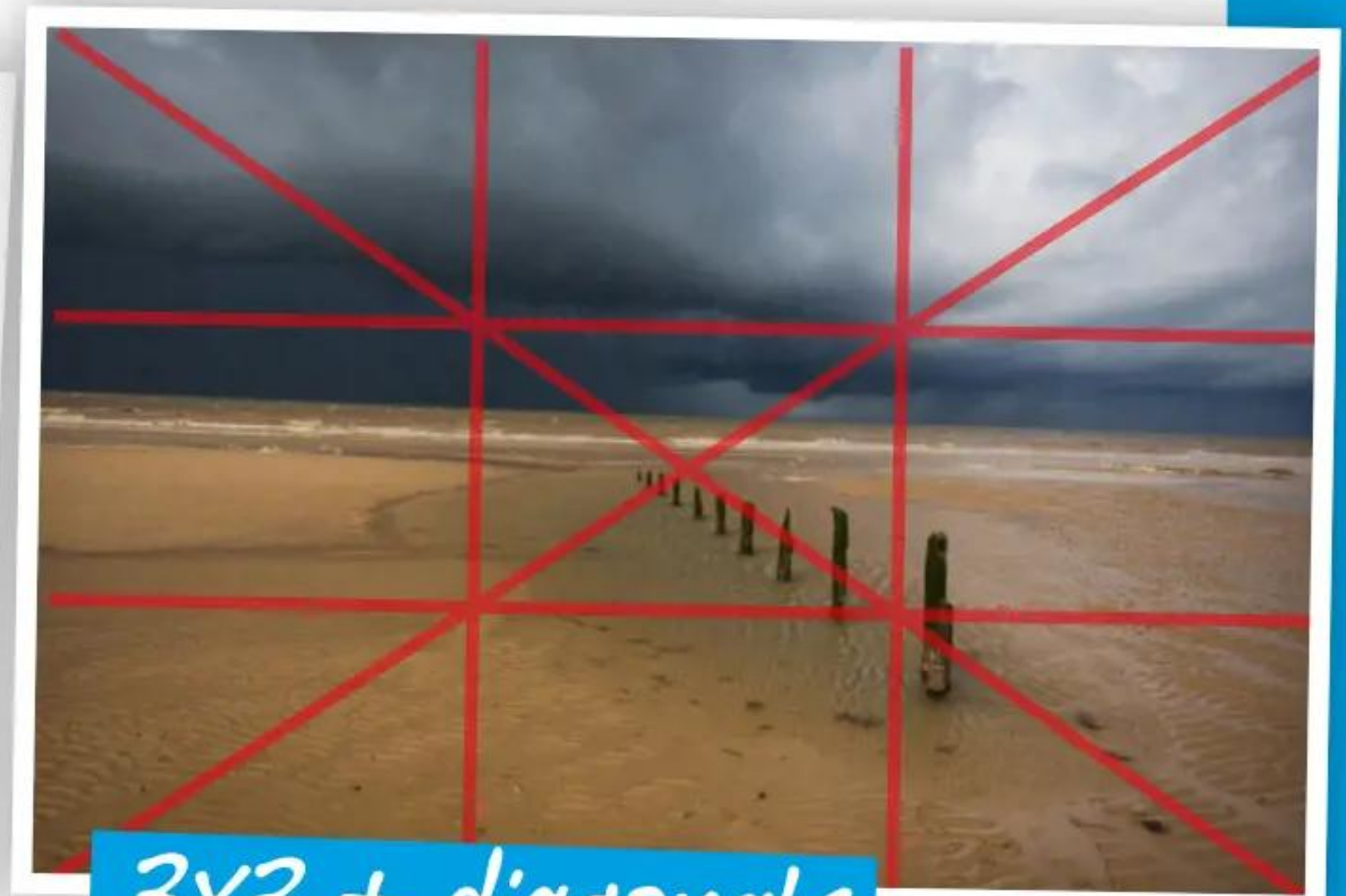
3x3 grid

This simple overlay will help you create balance by placing your main subject according to the rule of thirds



6x4 grid

Useful when you have lots of verticals like this, or when shooting building as you can look for unwanted image tilt



3x3 + diagonals

Added diagonals help you place subjects on intersections, or make use of powerful angles

School tip Release shutter without card

Avoid accidentally shooting images without a memory card

MOST CURRENT CANON DSLRs will tell you, via the LCD, if you are shooting without a memory card inserted, but it's still possible not to notice this fundamental mistake until it's too late. It's far better to set up your camera so that it refuses to shoot an image unless you have a card installed. Hunt through the red Shooting menu and you will come

across the option 'Release shutter without card'. Select Disable to switch this function off. Once done, the camera won't focus or shoot when you press the shutter button, until you pop a memory card in. However, whenever you put a memory card into the camera, it's always good practice to format it to remove the images from your previous shoot.



The importance of aperture

Take control of your apertures to reach new heights with your creative photography

A **perture control is one of the basics of photography.**

The aperture is simply the hole that light passes through in order to capture an image on the camera's sensor. This hole is actually in the lens, rather than the camera body. A ring of blades in the lens close up to form this hole, and its size is determined by the aperture setting you have dialed in.

When you press the shutter button, you activate a chain of mechanical events inside the lens and camera. Depending on your settings, the blades of your aperture close up to form a specific-sized circular hole, the mirror in your Canon DSLR flips out of the way, the shutter mechanism opens to expose the sensor to light, and the exposure is made.

While this is simplification, the point is that aperture size is controllable by you (within a fixed range), and by determining the size of the aperture you have one of the most useful creative tools at your disposal. Understanding how to control it with your DSLR will see your photography leap forward.

While aperture is only one of the three keys elements of the exposure triangle, it is perhaps the one that has the

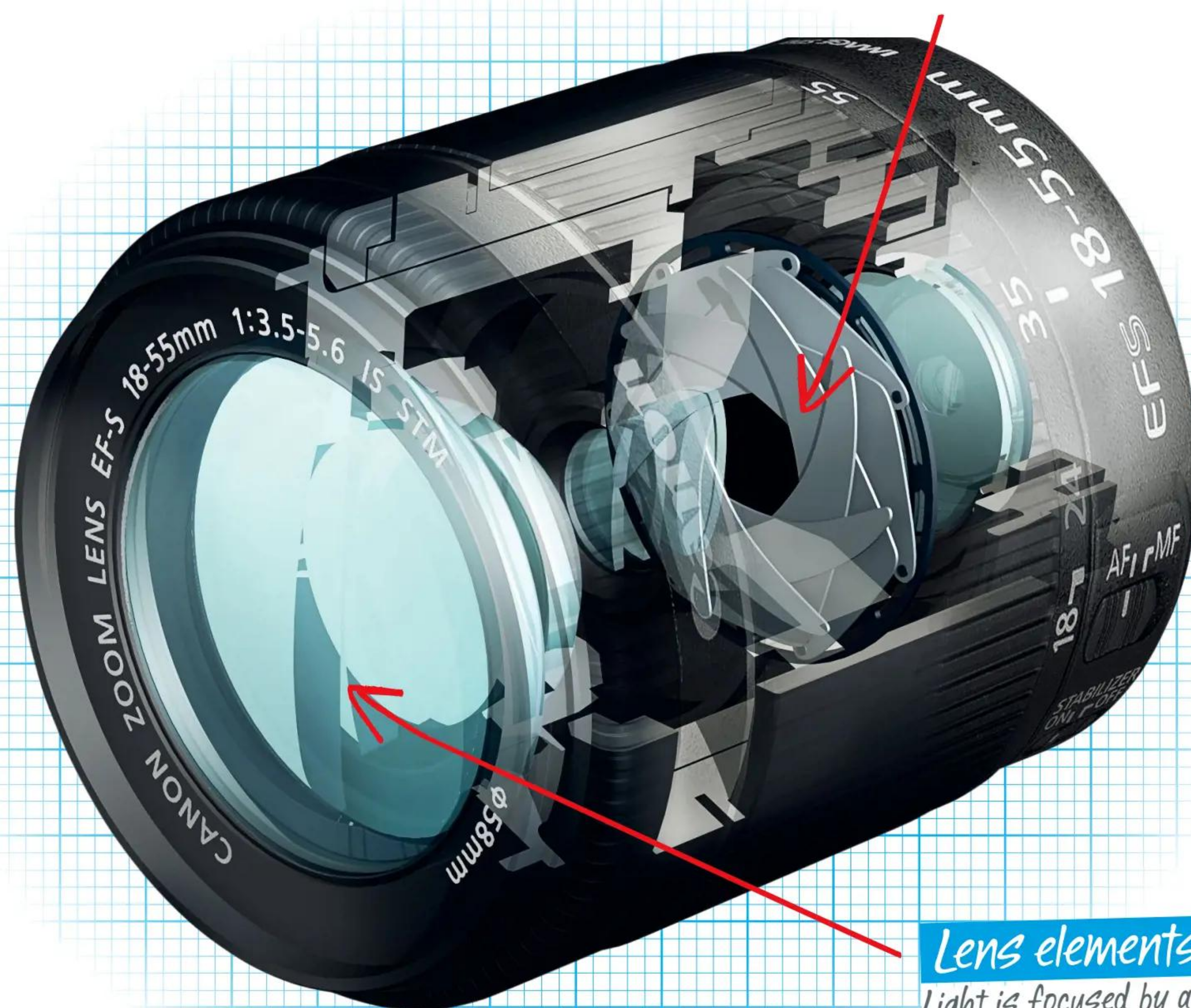
most obvious effect on your final image. This is why my first thought when taking a shot is always: what aperture do I need for the style of image I want? Once I know this, I can then consider the shutter speed and ISO to go alongside

it, to ensure the exposure is how I want it.

Of course, aperture control isn't the only creative element that you need to master, but by understanding the effect it has, you can set out with a specific end result in mind.

Aperture blades

The blades of the aperture mechanism form a re-sizable hole that light passes through and into the camera body



Lens elements

Light is focused by a series of lens elements before passing through the aperture blades

APERTURE EXPLAINED

Learning your f-stops

Knowing your aperture sizes is the key to better results

The size of each of the different aperture 'holes' is measured in f-stops. Newcomers to photography are often confused by the aperture f-stop numbering system, with its odd sequence that initially seems to defy all logic. For starters, a smaller f-stop number, such as f/4, means a bigger hole than a larger f-number, such as f/22. But

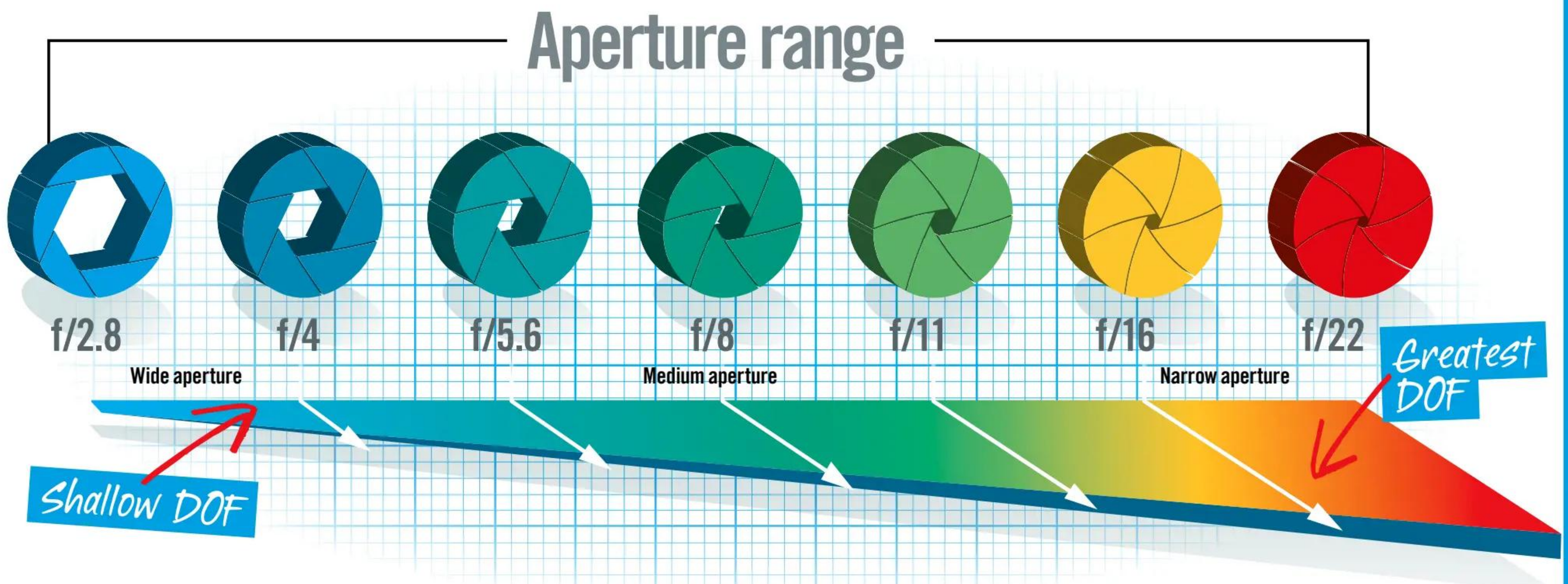
when you realise that this is expressing a fraction (the 'f' stands for focal length), so on a 50mm lens, 50/4 (12.5mm) is a bigger diameter than 50/22 (2.27mm), the 'back-to-front' numbering makes more sense.

A smaller hole lets in less light than a larger hole – this bit, at least, is fairly obvious and is why, when you open up the aperture you need a faster shutter speed to compensate,

and vice versa. Each increase in f-number on the f-stop scale halves the amount of light it lets in. So when you change your selected aperture from f/5.6 to f/8, for example, you are halving the light that is hitting the sensor, so you need to double the amount of time the shutter remains open for.

And as for that illogical sequence? A lens's typical range of full f-stops might go:

f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22. Look at alternate numbers and you'll see that f/4, f/8, f/16 represents a doubling, as does f/2.8, f/5.6, f/11, f/22. The mathematicians among you may recognise the sequence is actually a doubling of the *area* of its neighbour. Yet ultimately, while f-stops are complex, the range is small, and recalling the sequence soon becomes second nature.



Wide apertures

THE WIDEST APERTURES have f-stops with the smallest numbers. The maximum aperture available depends on the lens you're using. On many zoom lenses the maximum aperture gets smaller as you zoom in to the telephoto end.

Medium apertures

THE MIDDLE APERTURES on your lens tend to give you the best-quality images. However, they might not give you the amount of depth of field you require. Think of it as a balancing act, with some compromise required.

Narrow apertures

MOST LENSES HAVE a minimum aperture of f/22, although some stop at f/16 while others go down to f/32. As aperture gets smaller, depth of field increases. Ultimately, though, the image resolution deteriorates due to diffraction.

Aperture Priority

Shoot in Av or M modes for total aperture control

Choosing the correct aperture for either the lighting you are facing and/or your creative approach is fundamental to good photography. To be precise with this you can either shoot with the camera in full Manual mode or opt for Aperture Priority mode, which is displayed as Av on your Canon DSLR's Exposure Mode

dial – 'A' means 'aperture' and the 'v' simply stands for 'value'. In Av mode you select the aperture – such as f/5.6 – and the camera works out the corresponding shutter speed at whichever ISO has been set for a good exposure. Of course, like any given exposure it may not be 100% correct, but that's where checking

the histogram and applying exposure compensation comes into play.

I often use Av in preference to full Manual mode because I can control everything I need by keeping an eye on the shutter speed and, if the situation demands it, change it via altering the aperture or the ISO.



f-stop increments

Choose third or half stop increments for further adjustment

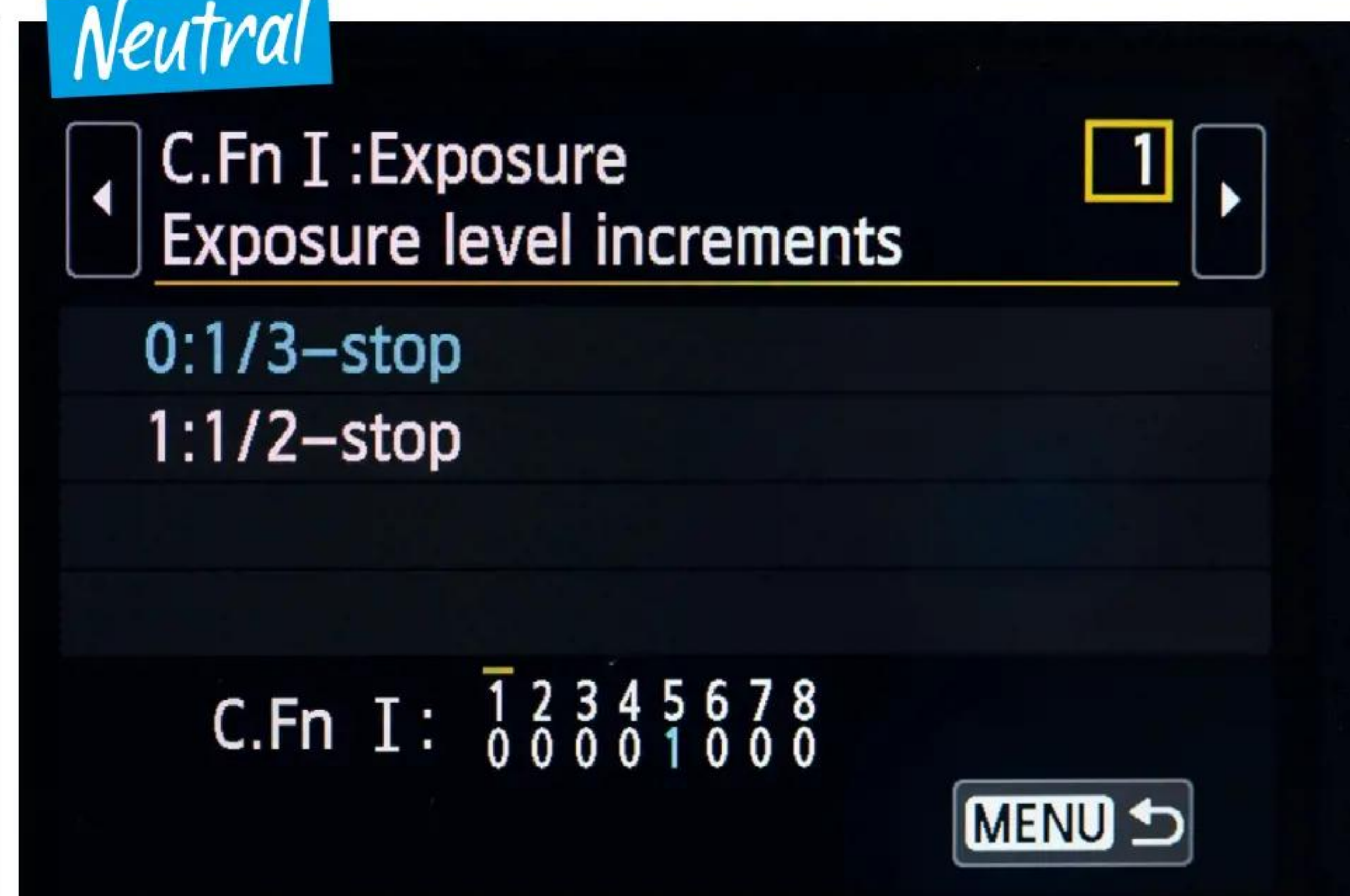
As you can see from the diagram below, in addition to the full range of f-stops, there are also increments in-between, and your Canon DSLR will enable you to set half or one-third f-stop steps (the default) via the menu. For example, while f/5.6 is a full f-stop and the next one in the sequence is f/8, between f/5.6 and f/8 there is f/6.7 if you are changing in half f-stops, or f/6.3 and f/7.1 if you are changing in one-third f-stops.

These exposure level increments apply equally to aperture and shutter speed,

so if you are working in Av mode and dial in exposure compensation, then the shutter speed will change by one-third or half an f-stop. Conversely, if you are shooting in Tv (shutter-priority), then the aperture will change in the given increments as you apply exposure compensation.

As a general rule, I try to set full f-stops for my working apertures – f/4, f/5.6, f/8 and so on – but for exposure compensation reasons, I stick with the default mode of one-third stop increments, as this gives greater control over fine-tuning your exposure.

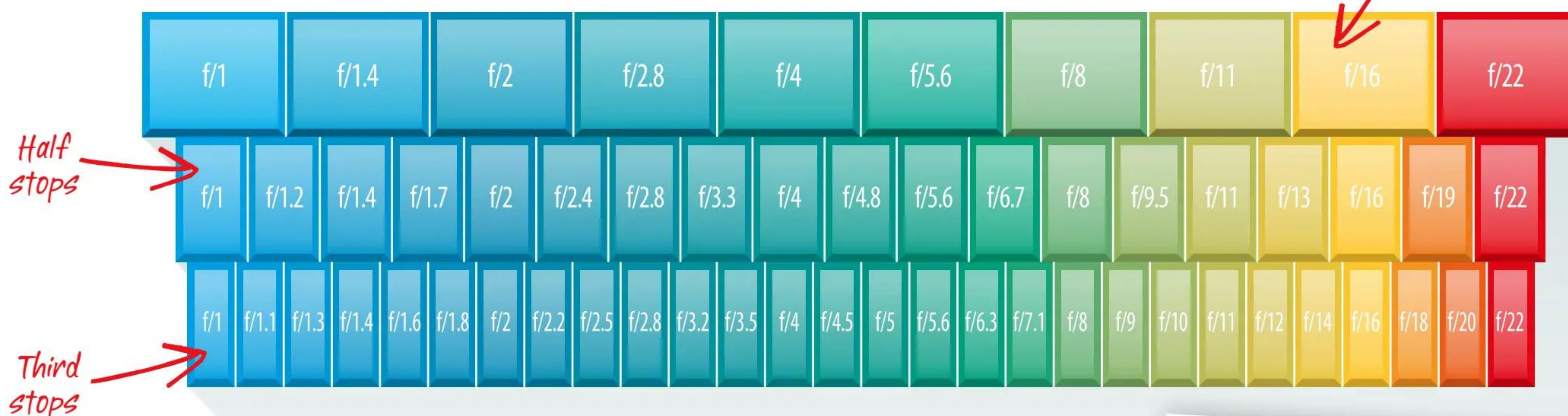
Neutral



Your camera will be set to one-third f-stop increments by default, but you have the option of changing to half-stop increments via the menu

Full, 1/2, and 1/3 f-Stops

With digital SLRs you will also see full f-stops divided into either thirds or halves. Here's your at-a-glance guide to the numbers...



The DoF Preview button

Use the depth-of-field preview to check for image sharpness

When you look at your scene through the viewfinder, what you are viewing is at the widest aperture of your lens. Therefore you don't see what effect aperture actually has on depth of field, so consequently have no idea how much sharpness you have within the image.

To see the effect you'll need to press the DoF Preview button, but

many photographers dismiss this as a gimmick, while some don't even know it exists! To demonstrate the effect, hold down the DoF Preview button and scroll through the apertures and look at the difference changing aperture makes to the sharpness of the background.

Part of the reason the depth of field button gets overlooked is that

the viewfinder can become so dark at narrower apertures that you can't even see the image, let alone the effect on sharpness. However, if you use DoF preview in Live View (with Exposure Simulation enabled), the image doesn't darken, so you get a good idea of the aperture you should be picking for the look you want.



You can only use DoF preview in Aperture Priority, Shutter Priority, Manual and Program modes, as it's only in these modes that you have influence over the aperture selected.

SHARPNESS CONTROL

Understanding depth of field

Control front-to-back sharpness in your image with aperture adjustments

Other than letting more or less light enter the camera as part of the exposure triangle, your chosen aperture has a profound effect on the look of your photograph as it affects the through-the-image sharpness, or depth of field.

Essentially you can only focus on a given point within a scene, but the choice of aperture determines how much of the image is in 'acceptably sharp' focus both in front of and behind the point

of focus (actually, it's not just the aperture that decides this – sensor size, distance to subject and focal length are also influences – but for simplicity's sake it is aperture, and specifically your choice of f-stop, that has one of the greatest impacts on your shot).

For example, creative shallow focus is a very popular way to push the viewer's attention to the desired point within the scene. Take a look at the sequence of still-life images below. Each was taken using an 85mm lens and the point at

which the camera has been focused is the second seed head from the right.

At the narrowest aperture of f/16 there is a lot of sharpness throughout the frame but, as the aperture opens, the depth of field is incrementally reduced until, at f/2.8, very little is in sharp focus, except part of the poppy seed head at the point of focus.

Changing aperture has a significant effect on shutter speed because, at each different f-stop, there is correspondingly one stop less

of light. At f/2.8 when the lens aperture is wide open, the shutter speed is 1/50 sec, whereas at f/16, the shutter speed drops to 1 sec, making it impossible to handhold the camera and take a sharp shot, however much depth of field f/16 might provide. In this situation it wouldn't be depth of field that was responsible for a blurred shot but camera movement. This is why we used a tripod and a cable release to fire the shutter, so the camera was rock-steady during every exposure.

**f/16**

At the narrowest aperture, acceptable sharpness extends to the window and the foreground labels are readable

**f/11**

At f/11 the difference isn't that obvious, but the labels in front of the seed heads are slightly more blurred

**f/8**

While there is plenty of sharpness, there is much greater diffusion in front and behind the point of focus

**f/5.6**

The background is now quite diffused and the smaller text on the labels in front has become impossible to read

**f/4**

Sharpness is very limited and the viewer's attention is very much on the seed heads, where I've focused

**f/2.8**

Only the seed head second-from-right is acceptably sharp, so depth of field is limited to a tiny plane

Lens choice

Know how focal length affects visible sharpness

We can't discuss depth of field without bringing lens choice into it. If you shoot with a wide-angle lens at a 20mm focal length and wide f/4 aperture, it appears that there is much greater depth of field in the resulting image than if you take a telephoto shot at 200mm, again with f/4 as your selected aperture.

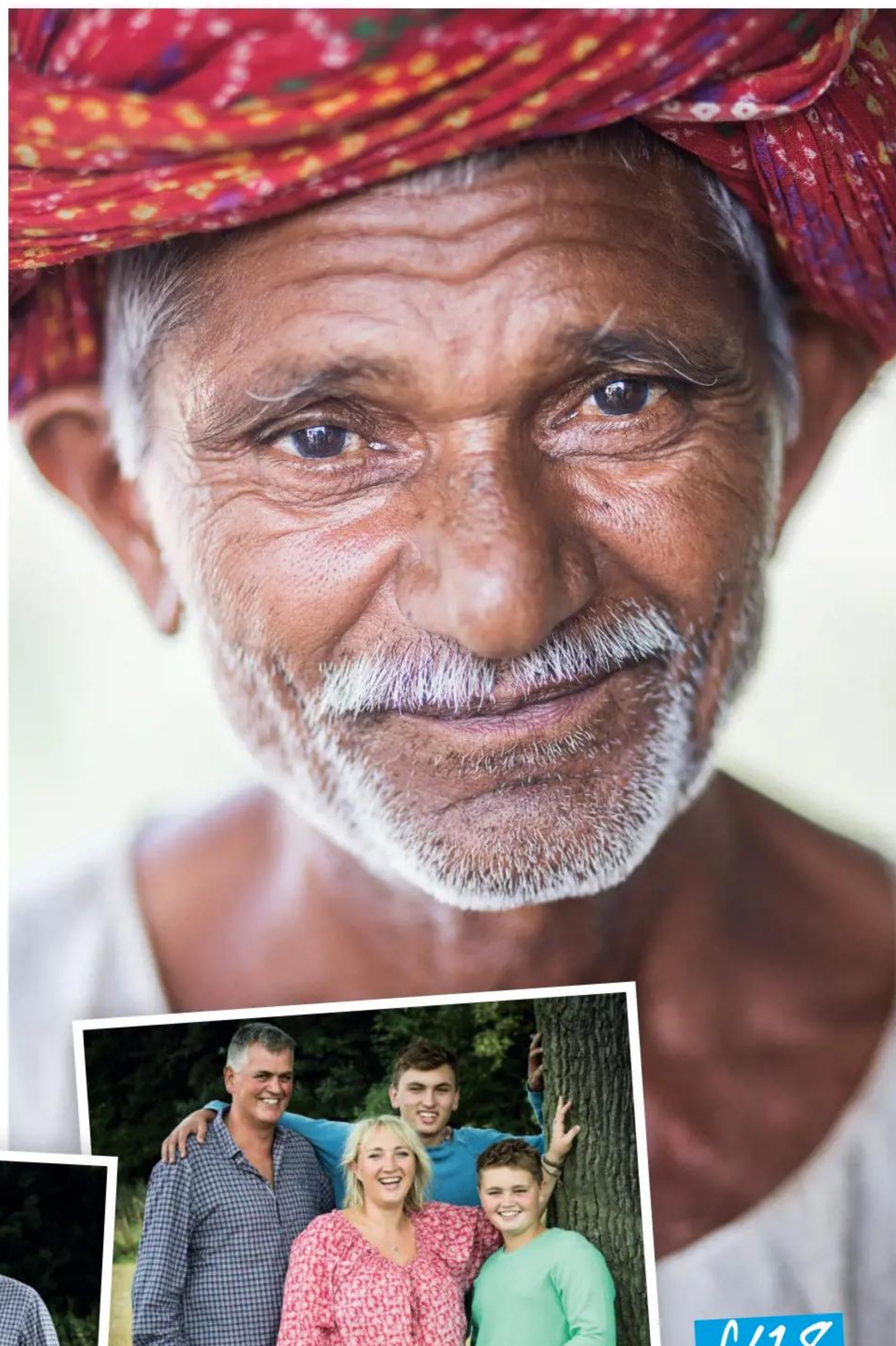
But in fact, if your subject remains at the same size in the frame – and you simply take the shot from further back – then both 20mm and 200mm focal lengths will give the same depth of field at f/4; it's your distance from the subject that counts.

Nevertheless, as you're unlikely to take close-ups with a wide-angle lens, to all intents and purposes a change of focal length makes a big visual difference to depth of field, and shooting with a telephoto lens at a wide aperture results in a very shallow area of sharpness.

One obvious area that this restricted depth of field comes into play is portraiture. This head-and-shoulders

portrait was taken with an 85mm lens at its widest f/1.8 aperture, giving a tiny amount of sharpness; precise focusing was essential, but used effectively it really can push attention onto the eyes.

This is fine for a single person, but for a group shot things become trickier as such a wide aperture will not give you enough depth of field to get everyone's face sharp. In the first group shot, also taken at a focal length of 85mm, a middle aperture of f/5.6 is necessary to get all the family members in focus. In the second shot, however, where there is a greater depth between their positions, a further change of aperture to f/8 was required to keep everyone acceptably sharp.



f/1.8

f/5.6

f/8

Minimum and maximum apertures

Not all lenses have the same apertures, and the faster you go the more you'll pay

The aperture quoted in a lens's name refers to its maximum aperture – that's the widest it will open. For example, the Canon EF 16-35mm f/2.8L USM has a maximum aperture of f/2.8 throughout its zoom range. However, a lens such as the Canon EF 24-105mm f/3.5-5.6 IS STM notes two apertures – this is because it has a 'floating' maximum aperture that varies according to its focal length, from f/3.5 at the wide-angle end to f/5.6 at the telephoto end.

What's less obvious is a lens's minimum aperture. This is typically f/22 but can be more or less – macro lenses can reach f/32 or more, while some wide-angle lenses stop at f/16.

Maximum aperture is the most important factor and lenses with very wide apertures are often called 'fast' lenses as the greater amount of light they let in enables faster shutter speeds to be used; they also enhance autofocus speed and accuracy as AF is actuated with aperture wide open.

But fast lenses can be eye-wateringly expensive – an additional f-stop of aperture can nearly double the price of a lens, as illustrated by Canon's 70-200mm f/4 or f/2.8 variants.

Whether this expense is justified is a personal choice. For newcomer or enthusiast photographers, I'd suggest that very expensive fast lenses aren't necessary, but are something you might want to move towards in the future, as they can give you a creative edge.



The EF 16-35mm f/2.8L can open up to f/2.8 through its focal range

PRECISE FOCUS

Aperture and focus

Precise focusing backs up aperture selection

We'll explore focusing in more depth in the future, but it is critical to the success of your image. I occasionally use hyperfocal distance (a precise calculation based on aperture and focal length to work out where you should focus) for landscape images, but usually simply focus roughly a third into the scene (as depth of field extends one-third in front and two-thirds behind the point of focus), for good front-to-back sharpness through the image, without having to work out precise distances.

In most other situations I'll focus on the point I want to be

critically sharp; in wildlife or portraits, this will be the eyes of the subject. If the lens is focused on the eyes of an animal at $f/5.6$ then the most important part of the image will be sharp, as long as shutter speed is fast enough to avoid camera shake or subject movement.

Take the two images here. The first was shot with a wide-angle 17mm focal length focused a third into the scene (where the reeds are) with an aperture of $f/16$. The result is more than enough depth of field for critical sharpness, from the foreground grasses to the ruined house.



A wide-angle lens and $f/16$ aperture gives sharpness from front to back



A telephoto lens and $f/5.6$ limits sharpness and blurs a distracting background

The tiger image was taken with a telephoto lens at 300mm. The main concern here is to select an aperture that will give enough sharpness on the head of the animal but not so much that a potentially distracting forest background is going to over-dominate the shot. Focusing – with a single AF point – has to be right between the eyes, and $f/5.6$ was selected to provide the balance between subject

sharpness and background diffusion. There is no room for focusing error or those eyes would not be sharp and the image would be deleted!

Depth of field in macro

Getting close to your subject reduces depth of field

There is another factor that influences depth of field; how close you are to your subject. And nowhere is this more obvious than in macro photography, where you shoot from extremely close up, thus capturing very small objects at life size.

While the principles of aperture remain the same with macro, the actual through-the-image-sharpness is greatly reduced. This makes macro photography an extremely precise

operation where pinpoint focusing and careful use of aperture have to combine for a successful image.

Look at these two example shots. At $f/2.8$ only the number 15 is in sharp focus. Stopped down to $f/16$ more of the tape measure becomes readable but, as you can see, we are only talking about a distance of about a centimetre in sharp focus.



The depth-of-field difference between an aperture of $f/2.8$ and $f/16$ is measured in millimetres with a macro lens, but it makes a big difference!

School tip Screen brightness

Turn up or dim down your LCD for better previewing

CHANGING THE BRIGHTNESS of your camera's LCD screen is not something you should need to do often, but sometimes brightening or dimming the screen may help you preview an image better. By default, your Canon DSLR will set a middle level of brightness, but turning it up or down by an increment may help you get a quicker gauge of your

image's composition, depending on the ambient lighting conditions and your eyesight. In bright light, an LCD shield or loupe can really help you see the screen. However, never use the LCD as a 100% accurate gauge of exposure; use the histogram for this and make ensure your Highlight Alert warning is switched on, too, for added information.



The need for shutter speed

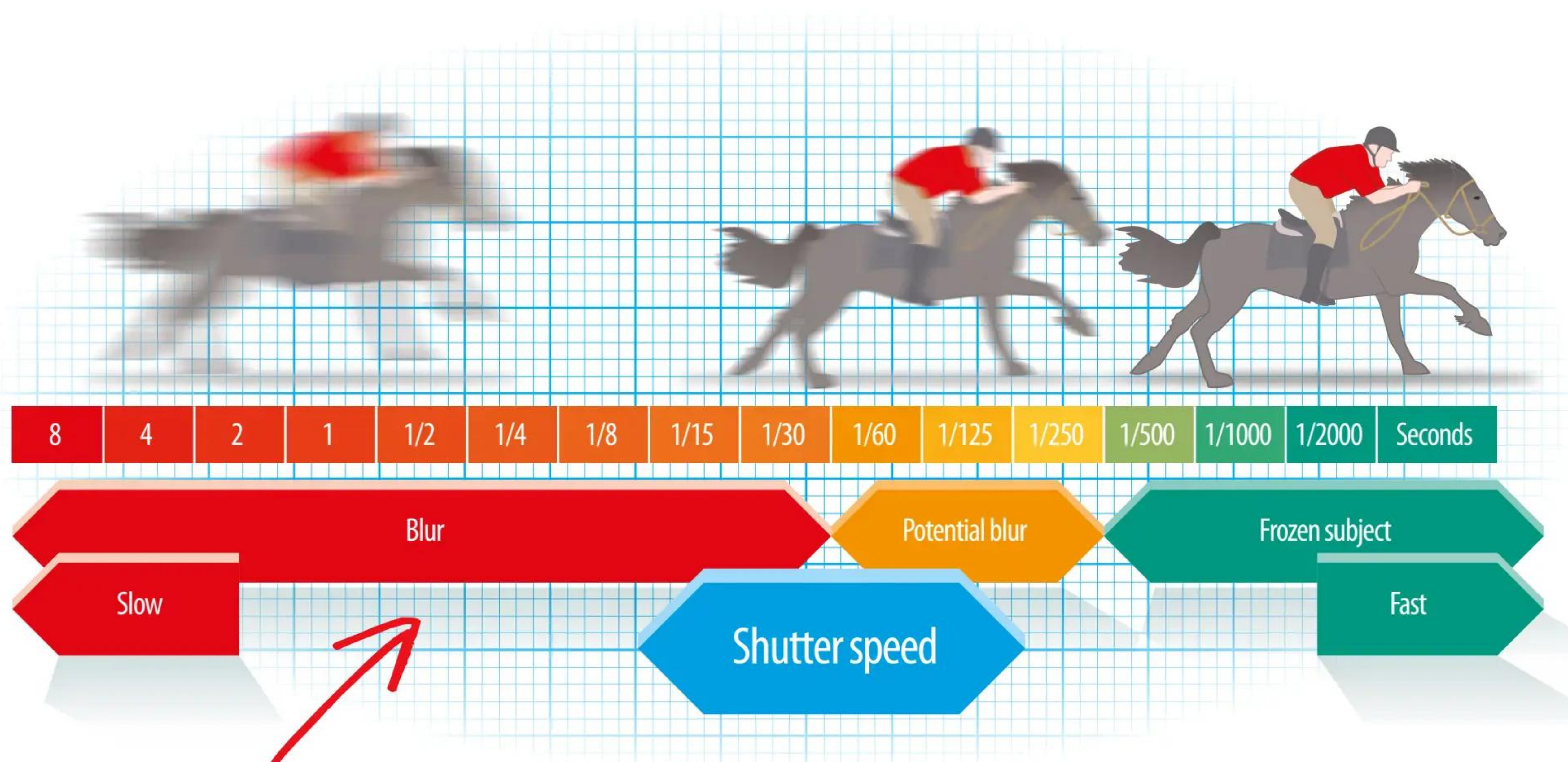
Get to grips with the basics of shutter speed for capturing anything that moves!

There are times when your choice of shutter speed can make or break your shot, so it's absolutely critical to understand how it works so you don't fall into any of the traps that can ruin your image. Shutter speed works hand-in-hand with aperture and ISO,

the two other elements in the exposure triangle. Shutter speed is simply the time the camera's sensor is exposed to light. Expose it for too long and you'll end up with an image that is too light (overexposed) but don't expose it for long enough and the image will be too dark (underexposed).

Most Canon DSLRs offer shutter speeds running from 30 seconds on the slow side to 1/4000 sec on the fast side, although enthusiast and pro DSLRs, such as the EOS 70D, 7D Mark II, 5D Mark III and 1D X, offer even faster shutter speeds up to 1/8000 sec. Just as with aperture, these shutter speeds can be changed in

either half- or third-stop increments – with third-stop being the default setting. But sometimes you may want a shutter speed even slower than the maximum 30 seconds. For this there is a shooting mode called Bulb, which allows you to hold the shutter open indefinitely for super-slow shutter shots.



Handheld speeds

There's a huge range of available shutter speeds, but for everyday, daylight use, the 1/60-1/500 sec range is commonly used

Horses for courses

TYPICAL SHUTTER SPEEDS that you'll use in normal daylight situations are 1/60 sec, 1/125 sec, 1/250 sec and 1/500 sec. These are expressed in fractions of a second and, as we discovered with aperture increments last issue, they represent a doubling or halving of the other. Take 1/125 sec: this is double (roughly) 1/60 sec or

half 1/250 sec. Imagine you're standing and handholding your DSLR, about to photograph a horse that is galloping in front of you. The horse's speed will be, approximately, 30 miles per hour, so anything below 1/250 sec risks some blur in your subject. Of course, the slower you go, the more blurred the horse will be, not only from its movement but the possibility of camera shake, too. The faster you go, the greater your chance of freezing it.

SHUTTER PRIORITY MODE

What's on the Tv?

What to know when using Shutter Priority mode

When it comes to shooting a subject where shutter speed is critical, it makes a lot of sense to use Shutter Priority (Tv) mode. Imagine you want to photograph a fast-moving subject, such as motorbike.

You turn the Main dial to the right to increase shutter speed and keep going until the shutter speed hits its fastest point. You take your shots but when you review them every single one is too dark. Why?

This is where Shutter Priority mode can catch you out, if you are not careful. While it allowed you to select a very fast shutter speed, it had no aperture it could match it with for a correct exposure, and the result was an underexposed shot. Of course, the camera did warn you – the maximum aperture display was flashing in the viewfinder – but it didn't actually prevent you from taking the shot.

Had you heeded the warning you could either have dropped the shutter speed or increased ISO until the maximum aperture figure stopped

flashing. However, if you ignored the warning then your shot would inevitably have been underexposed.

It's for this reason I prefer to use Av (Aperture Priority) mode, even for action. I set the aperture I want, based on how much depth-of-field I think the image needs, and then check the shutter speed. If it's too slow for the subject, I have the choice of either opening the aperture up more (if I can) or increasing ISO. Usually I'll increase ISO; for me, this makes more sense as I can make a creative decision on aperture first, and then alter the settings to get the shutter speed I need.

However, if you want to work in Shutter Priority mode and set a specific shutter speed, make sure the maximum aperture displayed in the viewfinder isn't flashing on and off. If it is, take the shutter speed back a stop or two, or increase ISO. There are two other things you can do to help in this situation, depending on the Canon model you own.

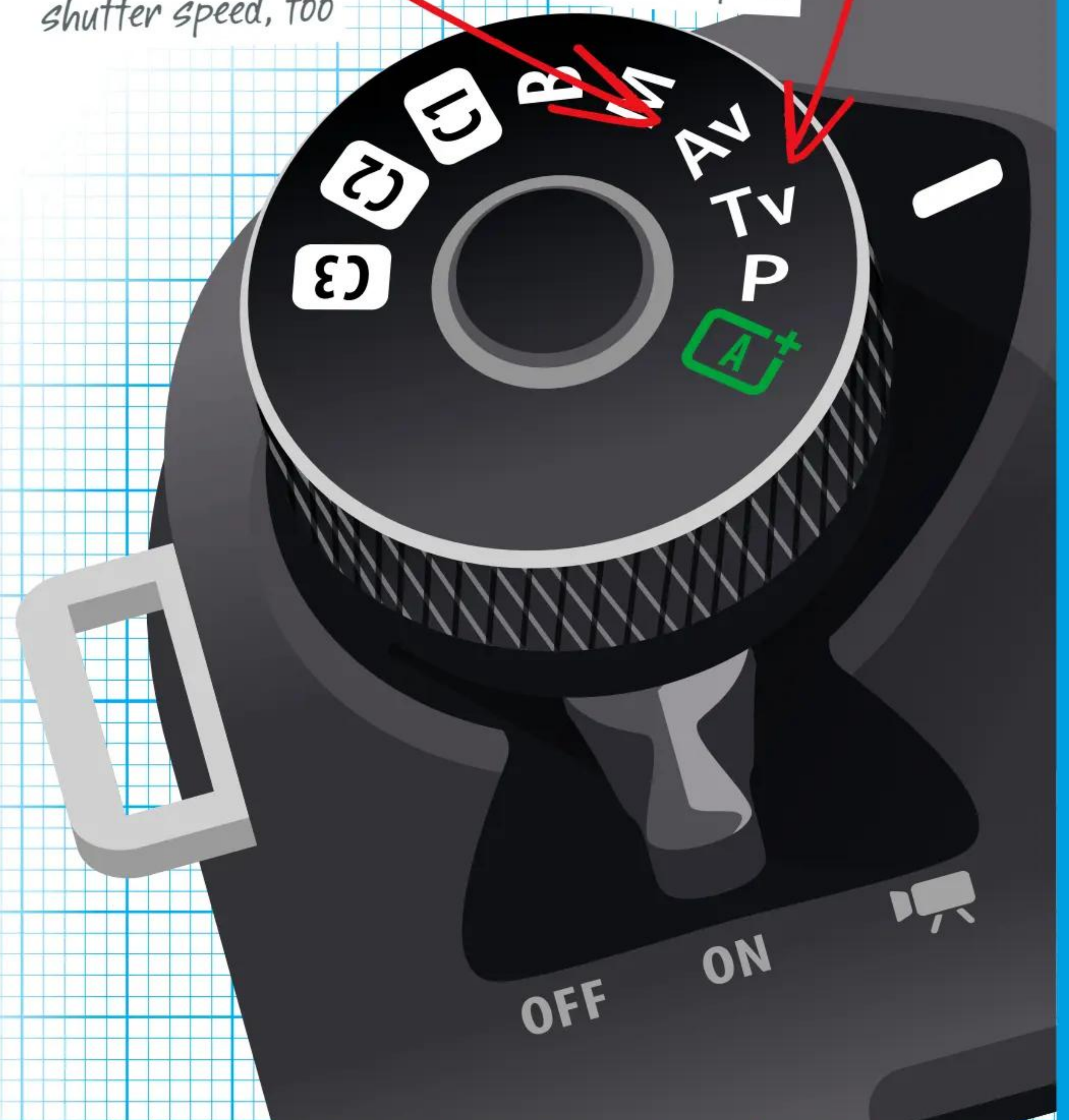
We explore these below...

Av mode

Aperture priority is labelled Av on the Mode dial. While it directly sets the aperture, it indirectly affects the shutter speed, too

Tv mode

Shutter Priority mode is marked as Tv on the Mode dial – it stands for Time value and gives you complete control over shutter speed



Safety Shift and Auto ISO settings

Avoid accidental exposure errors to achieve correct exposures

If your camera has a Safety Shift option then using it is one way of avoiding setting the wrong exposure in Shutter Priority (Tv) mode. Not all Canons boast this function, but most mid-range, high-end enthusiast and pro models do. Essentially, Safety Shift overrides your exposure if you exceed the camera's limits in shutter speed or aperture. For example, if you are shooting in Tv and set a shutter speed

faster or slower than the correct exposure can cope with, when you take the shot the camera will automatically change the shutter speed to give you a correct exposure.

You can also set ISO Safety Shift so that, if you try to set a shutter speed that's too high for the maximum aperture, then the camera will automatically increase ISO sensitivity to balance the exposure. However it can only work within the limits of ISO at

either end of the sensitivity scale.

If your camera doesn't have Safety Shift then you can set Auto ISO, which ensures that, should you exceed the exposure limits of shutter speed/aperture, the camera will set an ISO to bring the exposure triangle together for a correct exposure.

However, Safety Shift and Auto ISO come with a warning: while they may stop you from

accidentally setting values that don't deliver a balanced exposure, you are also losing some control because the shutter speed, ISO or aperture the camera selects may not be what you want for your image.



Fast freeze the action

Choosing the right shutter speed for your subject

It's really important to remember that shutter speed choice isn't just down to what you can get away with shooting handheld without causing camera shake. Your subject's movement is a big factor in the decision-making.

Take these two images of an osprey catching a trout. For both shots, the camera was on a tripod, so camera shake was eliminated. In the first shot, as the osprey flies down to snatch its breakfast from the lake, the light is poor. Even at ISO1600 and the widest available f/4 aperture, the fastest shutter speed possible was 1/125 sec. I knew this wouldn't be anywhere near enough to freeze the action. But with the camera and lens on the tripod, I opted to shoot it as a creative

movement image. The osprey's head is the sharpest – as it's moving the least. The rest of its body is blurred – particularly the wings that are beating hard to get lift off. The water spray also shows a lot of movement.

Contrast this with the second shot, taken 15 minutes later. The sun has come up and, consequently, the exposure has too. Still with ISO1600 and an aperture of f/4, the shutter speed has risen by two extra stops to 1/500 sec. While 1/500 sec isn't enough to freeze all the movement, the osprey's head, body, legs and the trout it's holding are sharp, as well as a lot of the droplets of water spray. The fast-beating wings are still blurred, and it would need closer to 1/2000 sec to freeze the motion in them.

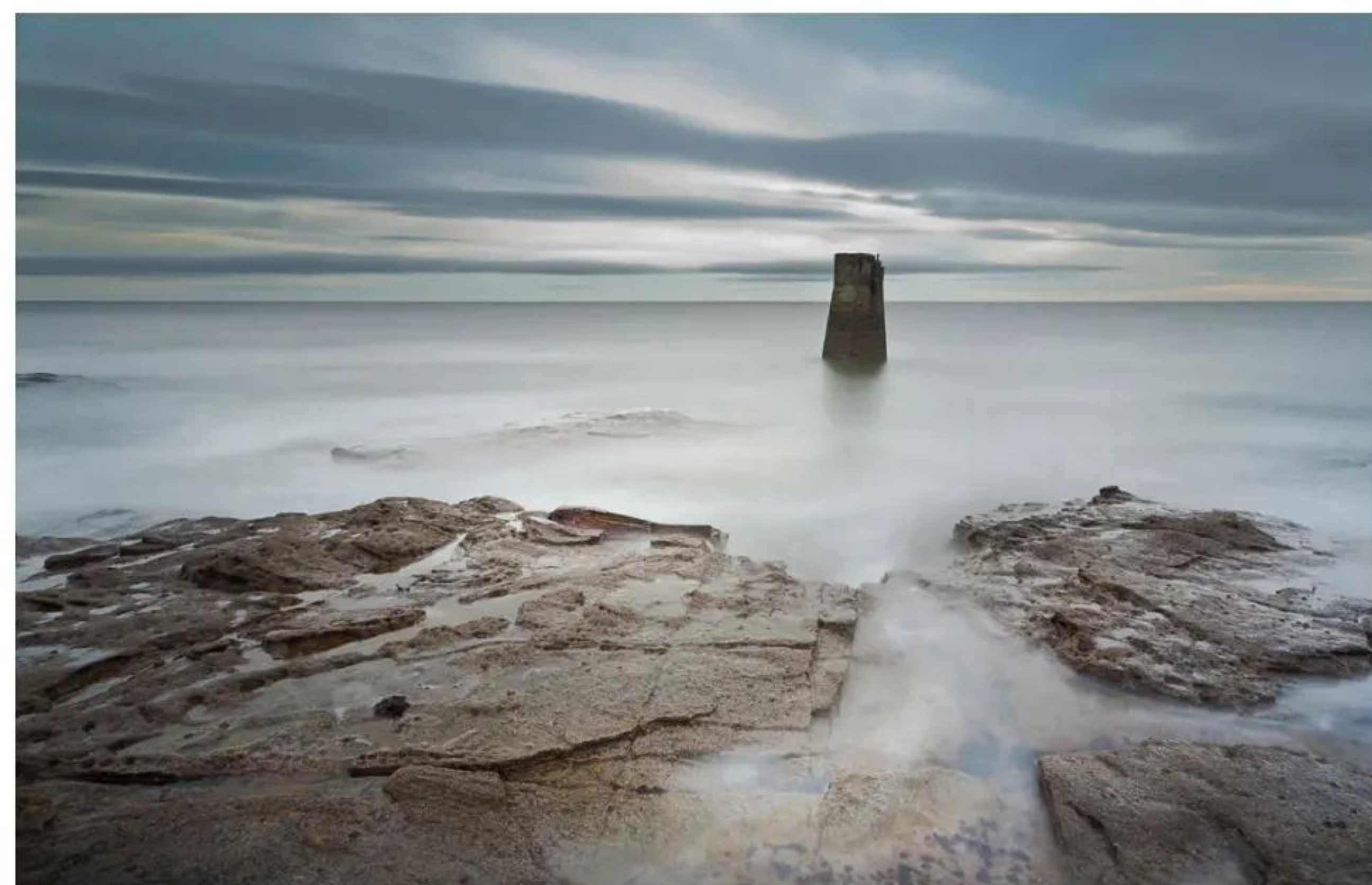


Super-slow shutter speeds in Bulb mode

Lock the shutter open for as long as you want for long-exposure photography

If you want to shoot a long exposure but you don't know how long, working in Bulb mode is the answer. On many mid-range and pro Canon DSLRs, Bulb is marked on the Mode

dial with the letter B. On other models you'll find Bulb mode by selecting M (Manual) on the Mode dial and turning the Main dial to the left so the shutter speed gets slower.



Bulb is the mode to select whenever your exposure time is likely to be longer than 30 seconds – but it can be useful in other situations, too

Beyond the slowest fixed shutter speed of 30 seconds you'll find Bulb.

With Bulb, the shutter remains open for as long as the shutter button is depressed; as soon as it is released the shutter closes. So, for any exposure that is longer than 30 seconds, such as a firework image, traffic trails, star trails, or even a daylight landscape taken with a 10-stop ND filter, then use Bulb.

You can use Bulb for shorter exposures, too. For example, I use it when light painting; it may be that the exposure will turn out to be less than 30 seconds, but if I am working in Bulb mode then I don't feel like I am rushing against the clock.

In Bulb mode you set the aperture manually – f/8 is usually a good starting point – then hold the shutter open. Use a cable release, not the shutter button itself, to avoid joggling the camera during the exposure.



On some EOS cameras, Bulb has its own setting on the Mode dial

Bulb mode is much simpler than it sounds, but the small matter of knowing how long to hold the shutter open for puts people off using it. If you were shooting a landscape with a 10-stop ND filter, then the exposure chart supplied with the filter, or a downloadable smartphone app, will give you an idea. Otherwise, it's a bit of trial and error. But with instant review and histograms on your LCD, it's not too hard to get it right.

PANNING

Follow the action

Add a whole new dimension to your action images

When shooting fast-moving subjects, a fast shutter speed is required to minimise blur, but this can result in a static-looking shot. One way

around this is to use a slower shutter speed and 'pan' to follow the movement of the subject so that it remains as sharp as possible while the background is blurred by the movement of the camera.

The most obvious use of panning is for subjects that move quickly across your frame, such as a bike, car, or, in our case, kart. Good panning is a combination of the right shutter speed, accurate focusing and smooth action on the photographer's part.

For our karting shot, we set a shutter speed of 1/125 sec in Tv mode, resulting in an f/11 aperture. With AI Focus set, focus was locked onto the subject well in advance. The kart was tracked, with the upper body swivelling around, to constantly follow its left-to-right trajectory.

When the kart reached a position slightly to the left of centre, the shutter button was fired and the panning movement of the camera maintained throughout the

exposure. The speed of panning is directly related to the speed of the subject; imagine a fixed invisible line between camera and kart that you need to keep straight throughout the process.

The panning movement has blurred the background, while most of the main subject is sharp – aside from motion blur in the wheels. This all helps to portray a sense of speed, as

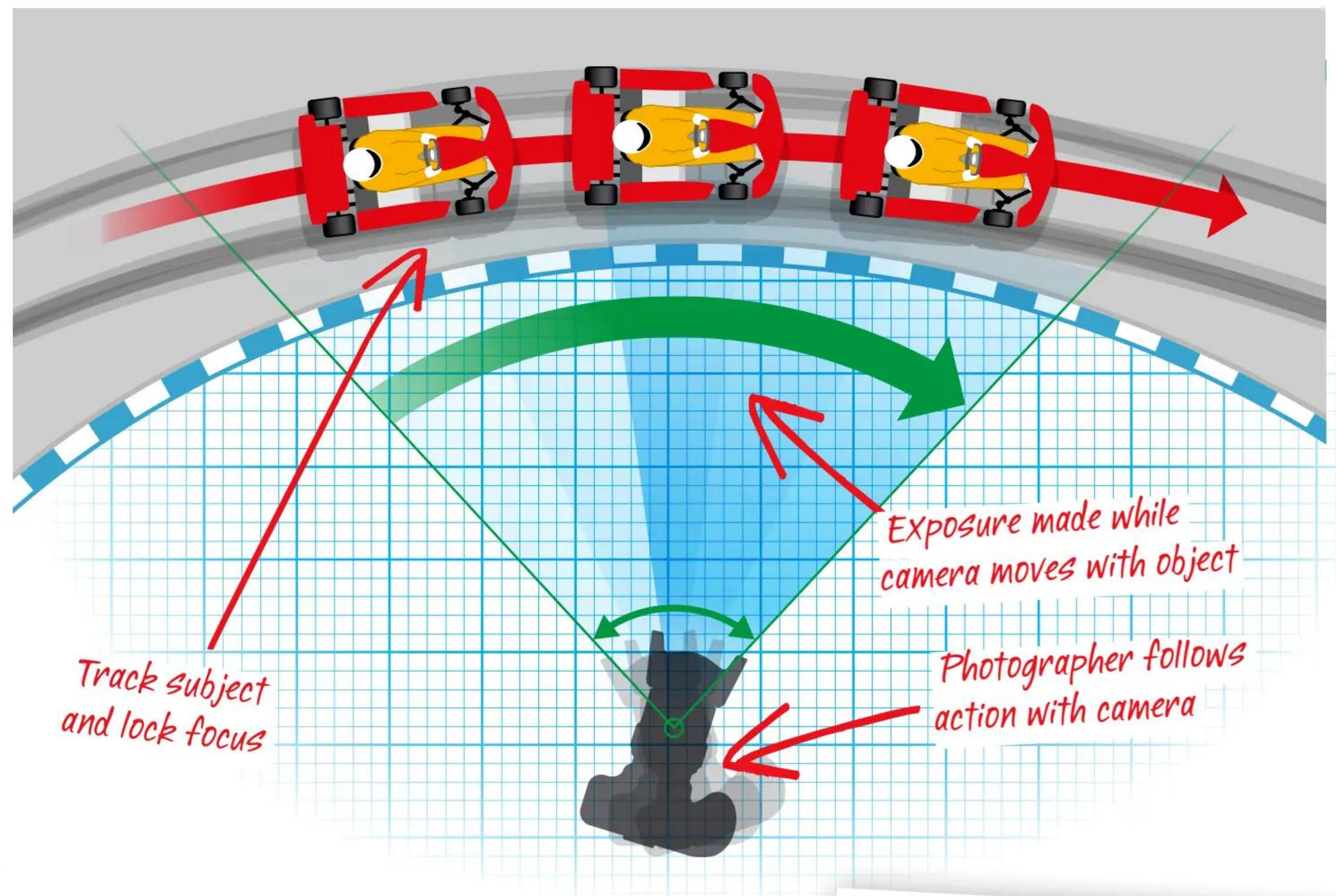
well as helping to separate the main subject from the background.

Of course, you can go slower with shutter speed and experiment as much as you like.

The slower you go, the harder it is to maintain critical sharpness in the main subject, and your image may take on a more impressionistic look.



The secret of panning is to follow the subject before you squeeze the shutter button; done well it gives a satisfying impression of speed



Get creative with vertical panning

Move the camera up and down for abstract motion-blur images

You can use a similar panning technique with a static subject, like trees, and a slow shutter speed to create a more abstract image. Unlike panning with an active subject, you only have one movement to consider, and that's the movement of your camera. For this reason, you don't need to focus in AI Servo mode and can switch to One Shot or focus manually. I actually find it best to use

One Shot to focus on the nearest tree and then switch to manual so the focus is locked off.

With focus locked, select a slow shutter speed, such as 1/30 sec or 1/15 sec, and tilt the camera up or down during the exposure. Just as when you pan with an active subject moving across you, your camera movement needs to be smooth and you must be moving before and after

you actually fire the shutter button. It's best to get yourself in a rhythmic up and down motion (a bit like a nodding dog) before you squeeze the shutter button. Whether you shoot on the upward or downward motion is up to you. Downward tends to be best if you want to avoid the sky and include more of the ground by timing your shot carefully.



Just as with any creative photography, some experimentation is needed to find the perfect combination of the shutter speed and camera movement, so keep reviewing your shots via the LCD.

All in the frame

Creating cool in-camera action sequences

With some EOS DSLRs (7D Mk II, 5D Mk III, 5DS/R and 1D X) you can shoot in-camera multiple-exposure images to take a sequence of a subject moving through the frame. However, if the subject is moving at considerable speed and your framing is tight, you may not be able to capture the complete movement. To give yourself the best chance, make sure your Drive mode is set to High-speed Continuous, so that when you squeeze the shutter release, the camera continues to fire for the number of frames you have specified (up to nine).

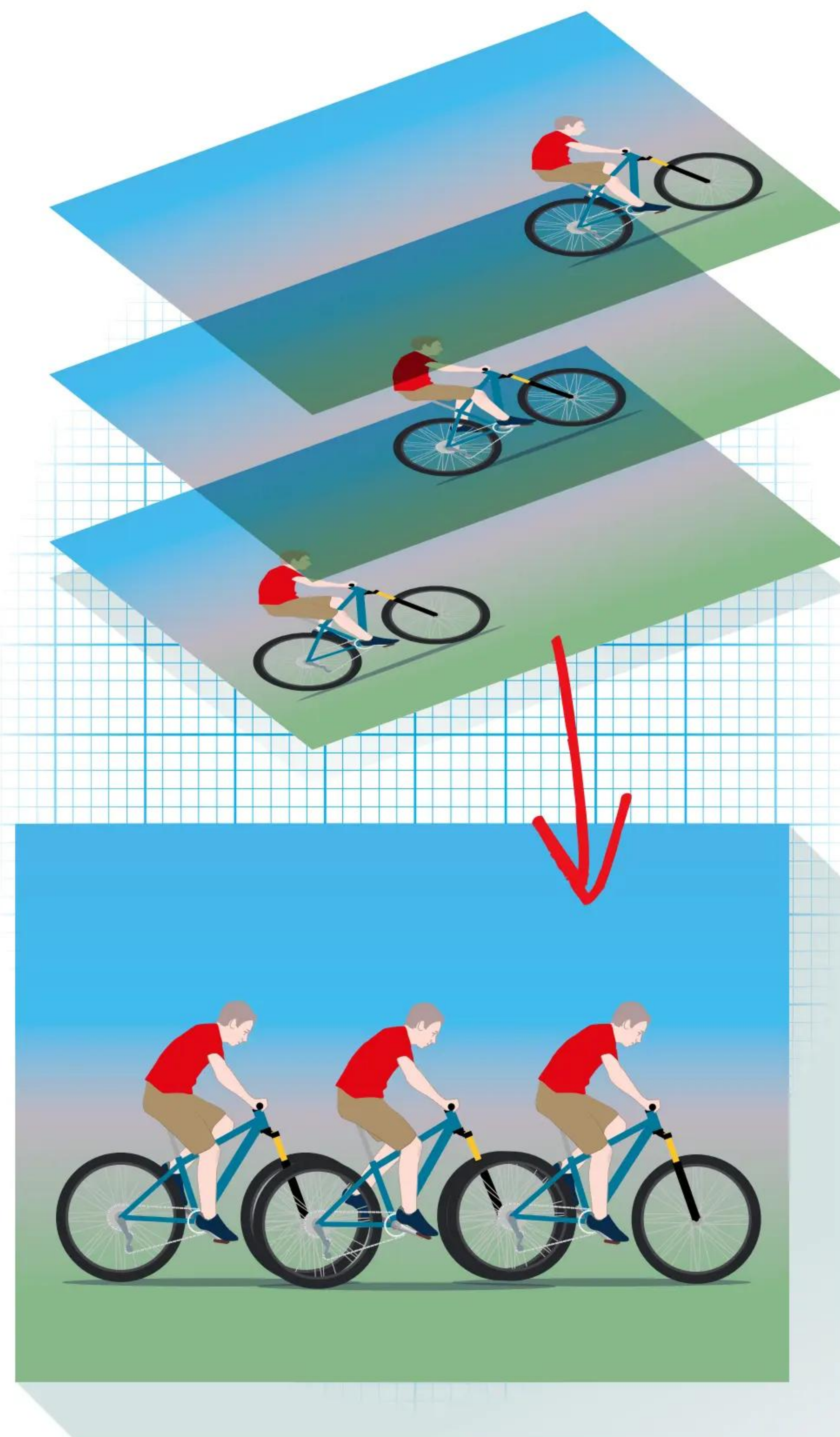
You must also remember that, if you are shooting a moving subject, you still need to set a fast shutter speed to

freeze it and, if you don't want the background to show movement too, then you need to remain as still as possible when shooting. Better still, fix your camera on a tripod. For our shot of the boy on the bike, the camera was on a tripod and pre-focused on the exact line he would take through the frame before being switched to manual focus. Then it was simply a case of timing the shots, as he cycled through at speed, so the sequence of three images were well spread through the frame for good composition.

Your camera will not save each of the frames separately – you only get the actual combined image – but if you are shooting Raw then the file can be processed as normal. If you shoot JPEG it will apply your chosen picture style. Shooting this way is fun but takes a bit of getting used to. The toughest element is getting the timing right so the subject isn't overlapping too much so it's best to start with a slower subject to try out the technique before switching to something faster when you've got the hang of it.



Multiple Exposure is only available on newer, higher-end EOS cameras



Taken handheld, this multiple-exposure shot freezes the cyclist as he passes through the frame, but the blur of the background spoils the shot



With the camera mounted on a tripod, the background remains static, resulting in a far more effective multiple-exposure image

IMAGE STABILIZATION

Keep it steady for sharp shots

How lenses with built-in stabilization can make a vital difference

When it comes to getting a sharp shot at slower shutter speeds, Canon's Image Stabilization system (or third-party lens makers' equivalents) is a huge help. IS detects camera shake and compensates for it. When you press the shutter button, tiny gyroscopes inside the lens sense any shake and pass this on to a microcomputer that moves a special group of lens elements to correct for it.

What goes on under the hood is of less importance to us as photographers, but what's vital is that IS can help you gain up to four stops – so if you shoot at 1/30 sec with IS engaged, you are shooting at the equivalent of 1/500 sec. A couple of words of warning – IS isn't foolproof and can't perform miracles. It won't guarantee you sharp, handheld shots at very slow speeds, such as 1/8 sec. Success will still depend on your technique and the focal length you are using. It has no impact on subject movement either – so if your shutter speed is too slow for the subject, your shot still won't be sharp!

The longer the focal length you use, the more your shot is susceptible to camera shake

too, so you have to compensate by keeping shutter speeds higher. An oft-quoted rule of thumb is to use a shutter speed that, at a bare minimum, is roughly equal to the focal length of the lens.

You will also often hear advice that says that IS should be switched off when the camera is on a tripod. For very

long exposures, particularly with older lenses, this is good advice, but many newer lenses will sense tripod use and automatically disable IS. If you are shooting with a long lens on a tripod and moving the lens to track a subject, then keep IS on as it will definitely help.

Many telephoto lenses have two Stabilizer modes. Keep the

lens in Mode 1 if you are using the camera normally but, if you are panning, switch to Mode 2; the lens will then detect the direction of movement and disable IS accordingly. Some high-end lenses also have a third IS mode. In IS Mode 3 the IS system only becomes active when the shutter button is fully depressed.



Modes 1 and 2

Mode 1 Image Stabilization is for handheld photography, while Mode 2 is used for panning



Mode 3

Mode 3 only actuates IS when the shutter is fully pressed, so the image in the viewfinder moves more naturally

School tip Mirror Lockup

Stop avoidable vibration spoiling a long exposure

ALTHOUGH NEGLIGIBLE THERE is the potential that vibration caused by the internal mirror moving up just before an exposure is made can cause loss of critical sharpness; this is most evident in long-exposure landscapes or macro photography.

The answer is to lock the mirror up before the image is taken. When you enable the Mirror Lockup function,

you have to press the shutter release twice; once to flip the mirror out of the way, and again to take the shot (you'll need to use a remote release to avoid jogging the camera, or the 2-sec Self-timer function). The delay before the image is taken will allow the vibrations to settle. Alternatively, if you shoot in Live View, the mirror is already flipped out of the way.



Understanding ISO

Changing your ISO setting helps achieve the appropriate exposure

Shutter speed and aperture are the glamorous two within the exposure triangle, while ISO isn't really seen as something to get too excited about.

ISO is just there, doing its job, as opposed to being outwardly creative. To some extent this is true but it's a bit unfair on ISO because the ability to change the sensitivity of the sensor from shot to shot is a huge benefit, from both practical and creative perspectives.

In the old days we couldn't change ISO without changing the entire roll of film. A film's sensitivity to light was set by the International Organisation for Standardisation (from which 'ISO' was coined), and we were stuck with it from the first shot to the last. The

flexibility of ISO on digital cameras revolutionised the way we take photos.

ISO has a fixed scale that we need to understand and this scale runs from low to high sensitivity, with each full increment representing one stop of light. So, for example, if we changed the camera's sensitivity from ISO100 to 200, we would be doubling its sensitivity, while cranking it up to 1600 would be increasing it by four stops. Why is this important? Well if you were standing holding your camera and about to take a photo when a big black cloud came over, you could simply press the ISO button on your camera's body to increase its

sensitivity, allowing you to maintain a shutter speed that is fast enough to avoid camera shake or subject movement messing up your picture.



Turn down the noise

High ISO increases the risk of noise

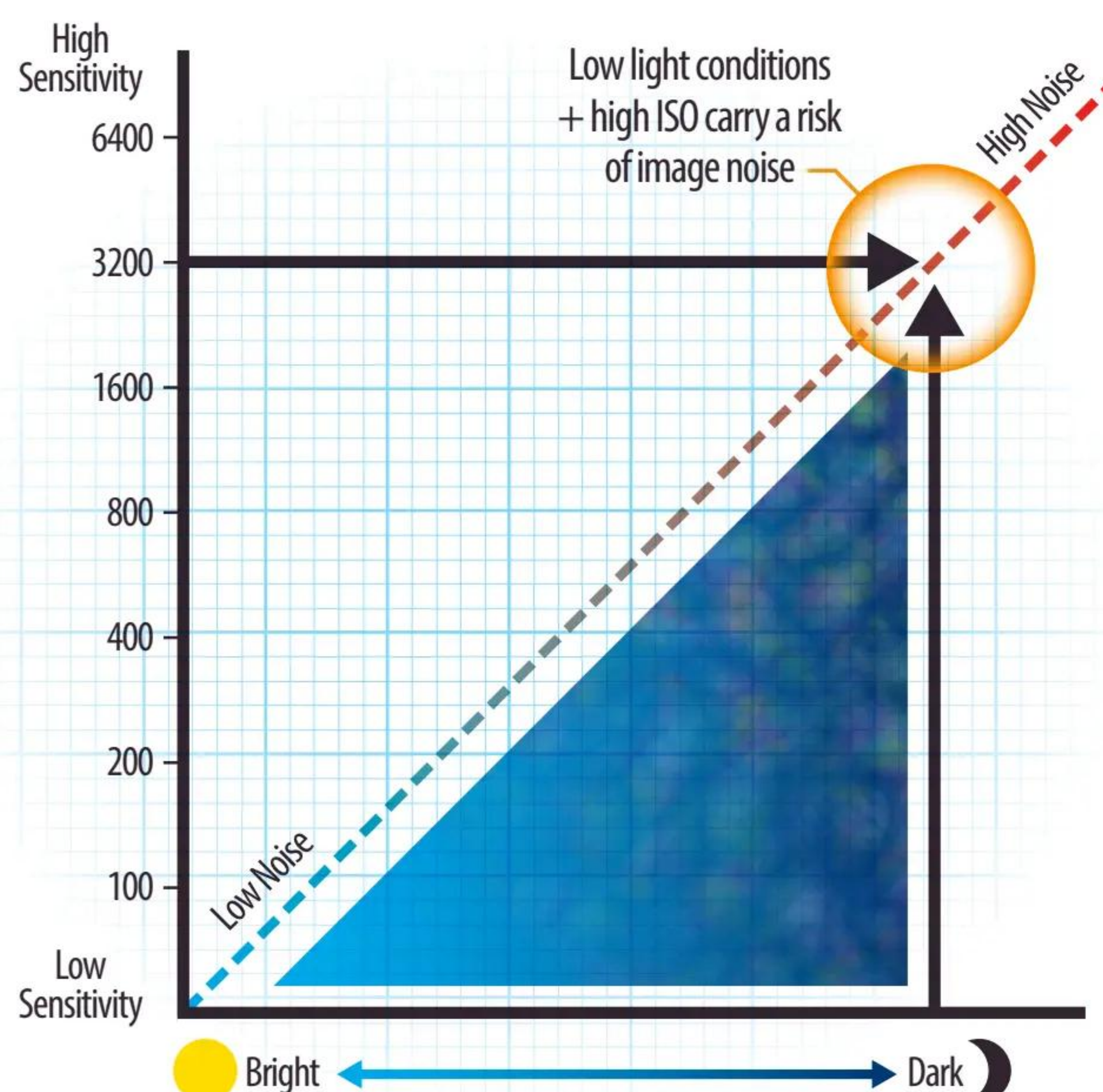
While increasing the sensitivity of your camera to light can be important, when you do there is a price to pay. The more sensitive the camera becomes, the greater the risk there is to image quality. At lower ISOs colour accuracy is better, the image is cleaner and detail is more refined. This is because increased sensitivity is achieved by amplifying the output of the sensor. In a bright situation, less amplification is required, but in gloomy conditions more is needed to boost the signal and this, in turn, results in image deterioration, commonly referred to as noise.

You will recognise it as either speckled 'grain' (luma noise) or small coloured blotches (chroma noise),

noticeable when you zoom in to look at your image very closely. How your Canon camera deals with this unwanted noise depends on a number of factors – which we'll look at over the next few pages.

However, it's important to remember that Canon has put in a lot of time and effort into reducing how much noise occurs when shooting at high ISOs, and recent cameras are incredibly good at producing quality images at these sensitivities. Software, such as Lightroom, is also very good at reducing noise in post-production.

The upshot is, it's better to put up with a little image noise due to increased ISO than camera shake due to a slow shutter speed.



ISO SENSITIVITY

Don't be so sensitive

Why you shouldn't be afraid of increasing ISO

Nobody wants a decrease in image quality, but sometimes the only option is to push ISO higher in order to achieve the correct combination of shutter speed and aperture for the shot you want.

Over the years there has been an innate fear of shooting at higher ISOs borne from the fact that early digital cameras weren't very good at handling noise at high ISOs and that software, like Photoshop, suddenly gave us the ability to zoom in to stare at every speck and dot we could find. It has made us paranoid about image

noise and obsessive about its eradication or avoidance.

Ultimately, the point at which noise becomes 'unacceptable' is a personal choice and not one that should be based only on staring at a photograph on your computer screen. Try taking a series of test shots of something with different colours and a mix of highlights and shadows, running right through the ISO range. You need to make sure that aperture and lighting remains consistent throughout the test. Assess where you start to see noise come into the equation. Typically this will be around ISO800 or 1600.



Noise you can see zooming in on screen may go unnoticed in print

Make a number of prints of the high ISO frames and you will probably be surprised how little of the noise that you can see on the computer at 100% is obvious on the prints.

It's also worth pointing out that a picture with some noise is better than no picture at all.



Auto ISO settings

Put a limit on the camera's auto choice

Once you have a good sense of what you think is acceptable or unacceptable in terms of noise, you can use this knowledge to set some parameters when you're using Auto ISO. Don't use

Auto ISO as a default setting because you're handing too much control to the camera. However, there is a case for Auto ISO in certain situations.

For example, where the light is constantly changing and you don't have the time to keep readjusting ISO because you are too busy shooting. This has happened to me at an equine sporting event where the sun was in and out, frequently changing from gloomy to bright, like a light switch being flicked on and off. To ensure the ISO didn't go above what I felt was acceptable on my camera, I set a minimum and maximum ISO to be used in

Auto. In my case this was 100 minimum and 1600 maximum.

On some older Canon DSLRs you can only set a maximum ISO limit but, as it is the maximum where you'll run into potential noise issues, this isn't really a problem. When shooting in Auto ISO, the camera tells you which ISO it is choosing in the bottom-right-hand corner of the viewfinder, so you can keep an eye on what it's setting.



Auto ISO is handy when faced with variable lighting

How high can you go?

Compare ISO from old and new cameras side by side

To judge how far ISO performance has come over recent years I took a series of shots of the same subject at different ISOs with a Canon EOS 700D, 5D, 5D Mark III and a 1D X. This was a 'real life' photography test, rather than a strictly controlled laboratory one, but I made sure all influences were as consistent as possible.

ISO100

THE LOWEST NATIVE ISO on the EOS 700D, 5D and 5D Mark III and 1D X is 100. There is no discernible noise at these low settings on any of the images and, as expected, every camera did an excellent job. Note that while some cameras enable you to select an even lower ISO50, this won't give you less noise than ISO100 – and has its own issues of compromised quality (see right).

ISO1600

ALL MODELS DID a reasonable job at ISO1600 but when zooming in the 5D and the 700D started to show their failings – with some discernible noise, particularly in the shadow areas and a lack of sharpness affecting image quality. The more modern 5D Mark III and 1D X, as expected, performed much better, with little or no sign of noise, even when zoomed in at 200%.

Highest ISO setting

THE FINAL SHOT was taken at each model's highest native ISO setting (except the 5D, where we needed to use the H setting for ISO3200). The 5D does a reasonable job, but it's two stops behind the 700D's ISO12,800, which showed considerable noise. The 5D Mark III's performance at ISO25,600 is considerably cleaner and sharper. The 1D X performance at ISO51,200 is more impressive still.

1D X



ISO100



ISO1600



ISO51,200



5D Mk III



ISO100



ISO1600



ISO25,600



5D



ISO100



ISO1600



ISO3200



700D



ISO100



ISO1600



ISO12,800



ISO EXPANSION

Push the envelope

Pushing to the outer levels of ISO performance

Canon EOS DSLRs also allow you to expand the ISO range. Not only can you expand upwards but you can sometimes expand downwards to an even slower ISO. The default ISO range of your camera is known as the 'native' range, so anything falling below or above that is referred to as 'expanded'.

Expanding upwards beyond the native settings will also always mean that the resulting images are going to be prone to considerable noise, so quality will be an issue.

Take a look at the two example images taken on the 1D X at H1 (ISO102,400) and

H2 (ISO204,800). Even when expanding ISO to these two stratospheric ISO settings, the result is usable. Of course, there is considerable visible noise and a general loss in overall quality, so it's not really recommended other than as a last resort. But when you consider that H2 is six stops above the highest possible ISO setting on the older 5D then it's easy to see how far ISO performance and opportunity has climbed in recent years.

If your model allows you to go lower than ISO100 – by setting ISO50, you need to be aware that this can affect the dynamic range of the highlights by one stop.

1D X - ISO102,400



1D X - ISO204,800



In-camera noise reduction

Control high ISO noise with your DSLR's settings

Most Canon DSLRs have a setting for High ISO Noise Reduction (NR) hidden within the menu. Some older models only have an on/off option, but in newer cameras you'll find there are four settings – Off, Low, Standard and High. So, is there a case for utilising the other settings, or even switching it off altogether? Well, if you didn't know it was there in the first place then I wouldn't suggest switching it off as it clearly is having no negative effect on your images.

Having experimented a lot with the settings in controlled situations, Standard is certainly the best default mode, and switching it off entirely would be a mistake unless you never shoot above your camera's minimum ISO setting. Even then, the Low setting may be a better option to disabling it. The High setting does have its place when shooting at very high ISOs. Be aware though, there is some loss of detail in return for the reduced noise. As always, it's a question of compromise and while you gain on one hand, you lose slightly on the other.

NR off



NR low



NR standard



NR high



Bring the noise

Expose to the right at higher ISOs

If you need to shoot at high ISO it's impossible to avoid noise altogether. But you can minimise it. We've already looked at High ISO NR, and this should be switched to at least Standard if you are expecting to push ISO into the higher brackets. But to avoid it further you need to understand where and when it is most obvious.

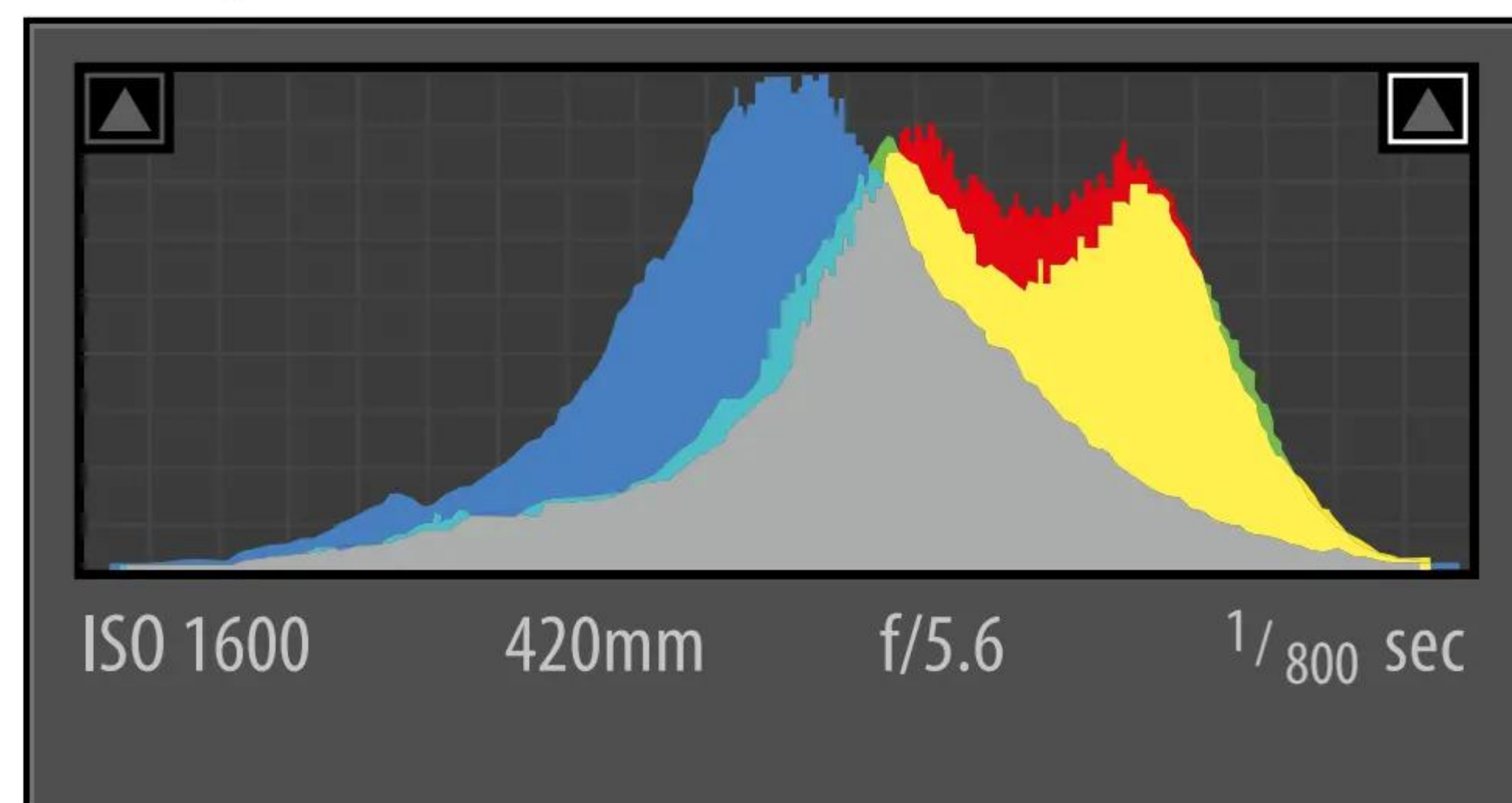
The kind of noise we don't like is most visible in midtone and shadow areas, so an image that is predominantly lighter in tone will show less noise than one that is darker in tone.

When shooting at a high ISO try, wherever possible, to avoid underexposure and push the image's tones to the right of the histogram.

Take this tiger photograph as an example. It was taken early morning on an overcast day, so light conditions were poor. A high shutter speed was needed to avoid camera shake with a handheld 400mm lens, so the ISO was cranked up to 1600. By exposing to the right of the histogram (but without overexposing the highlights in the tiger's fur) noise has been controlled.

Use the histogram

When shooting at high ISOs, it's important to 'expose to the right', but taking care not to clip the highlights



Before



After



Choosing your file type

How ISO settings affect your file sizes

It's a little known fact that the higher your ISO setting, the larger your file size. Here are our results using a 7D Mk II to shoot the interior of an abbey in low light: at ISO100 Raw image files were 23Mb, at ISO1600 files were 26Mb, at ISO12,800 files were 32Mb, and at ISO51,200 files became much larger at 37Mb.

Shooting in the Raw quality gives you the maximum flexibility, control and quality possible. Your Canon DSLR comes with at least one Raw file option and then several JPEG options, determining both the resolution and amount of compression. For highest quality, particularly if you want to print

your photographs, choose ISO100, and either maximum-resolution Raw or Large, Fine JPEG.

With each different file size, the amount of images you can fit on your memory card and the maximum burst rate will change. At the highest settings you may get the best quality but the payback is fewer images on your card and faster lock-out of the buffer. For example, the EOS 5D Mark III has eight different JPEG sizes and three different Raw sizes. As each file gets smaller, so does its printable size. A Large, Fine 22Mp JPEG file from the 5D Mark III can be printed up to A2, while an S2 JPEG is just 2.5Mp and is really only



suitable for uploading to the web or emailing. You may have good reasons to shoot a smaller file size but remember, if you do, you can't get the bigger, higher quality file size back. Whereas if you shoot at high quality, you can always reduce a file size, save it as a different file and retain the original, too.

PICTURE STYLES

Give shots a different look

Change the way your JPEGs are processed to suit your tastes

If you do choose to shoot JPEG, rather than Raw, you can still make the camera process your files how you like them, and you do this by harnessing picture styles. With picture styles you can select a processing style you like, in a similar way to photographers selecting different types of film according to how saturated or natural they wanted the results to be.

Picture styles have been around in Canon DSLRs for a long time but early versions were not adjustable. Now you can have greater control over the end result by setting the amount of Sharpness, Contrast, Saturation and Color Tone you like before you shoot.



Landscape

For improved Colour Tone and increased Saturation, especially in greens and blues, use Landscape. The Sharpness setting is also ratcheted up a notch.



Portrait

Sharpness is slightly less than with Standard, but Color Tone and Saturation are turned down to ensure natural skin tones. A good picture style to pick for a wedding, for example.



Neutral

As the name suggests, this style provides a 'straight' colour image without any extra Saturation. There is no additional Sharpness, either.



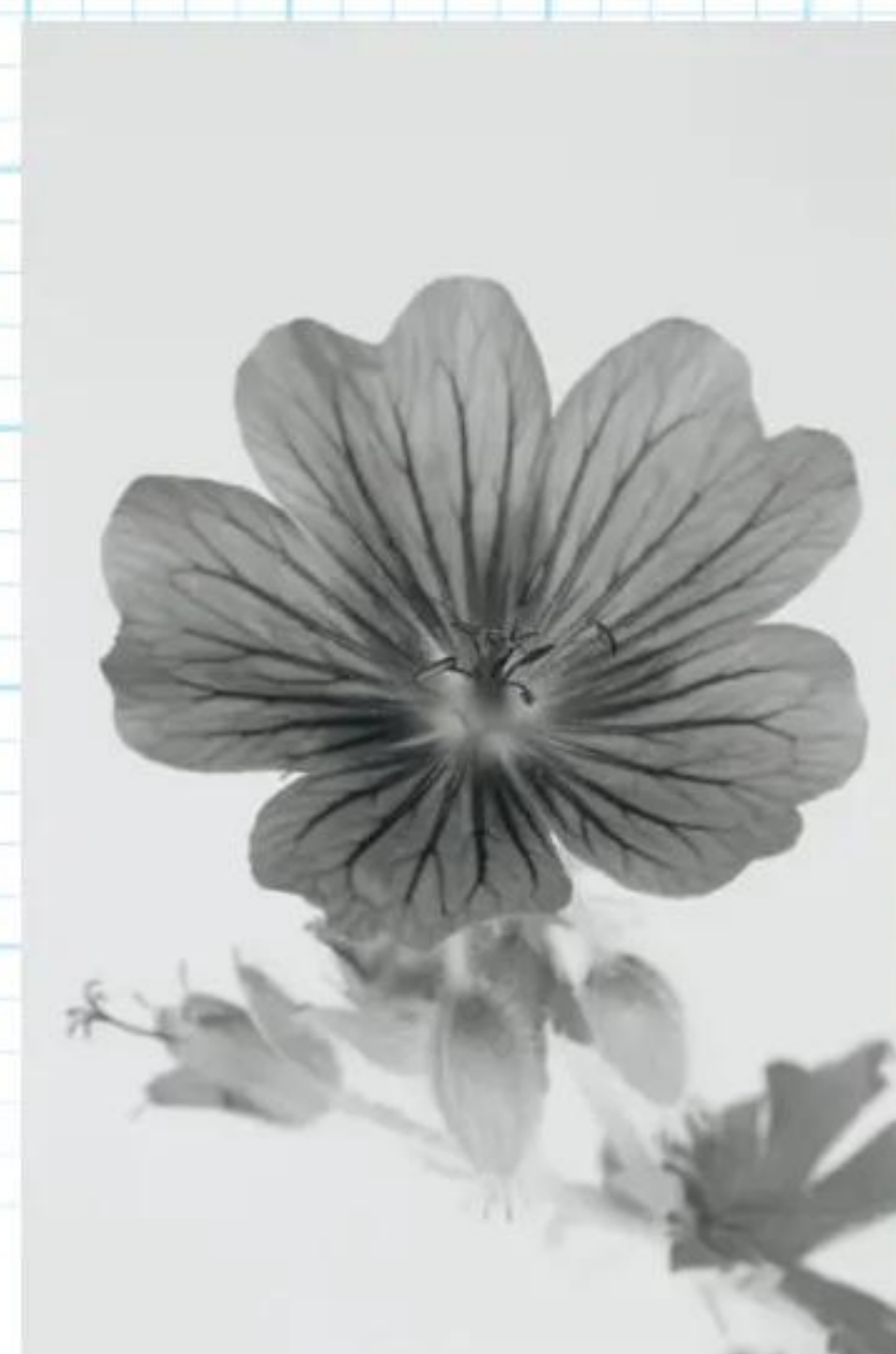
Faithful

Similar to Neutral, with no Sharpness, Saturation or Contrast added. Best to use when shooting Raw, so your preview doesn't provide a false impression.



Standard

This setting is your 'middle of the road' picture style and you'll get saturated colour and sharp shots. Use it as your default if you are a general photographer who shoots JPEG.



Monochrome

As you'd expect, shoot with this style and you'll get black-and-white JPEGs. Remember, though, you can't turn them back to colour later, unless shooting Raw.



Auto

Your camera selects the style it thinks most appropriate according to the colours and tones in the scene. This is usually the default setting.

School tip User Def. picture style

Create your own JPEG style for greater image control

AS WELL AS fine-tuning each picture style you can also create your own with the User Def. options. In the Picture Style menu simply select one of the three User Def. options on the bottom of the list and press the Info button to go into it. You will need to select one of the six preset picture styles as a starting point, and then adjust Sharpness, Contrast, Saturation and Color Tone to your tastes using the individual scales. Once done, the User Def. option you

created will be displayed on the list. It's also good idea to add picture styles to your My Menu listings so you can change them quickly.

Your own style

You can easily create your very own picture styles, but need to base it on one of the existing presets



In-camera metering

How your DSLR interprets reflected light

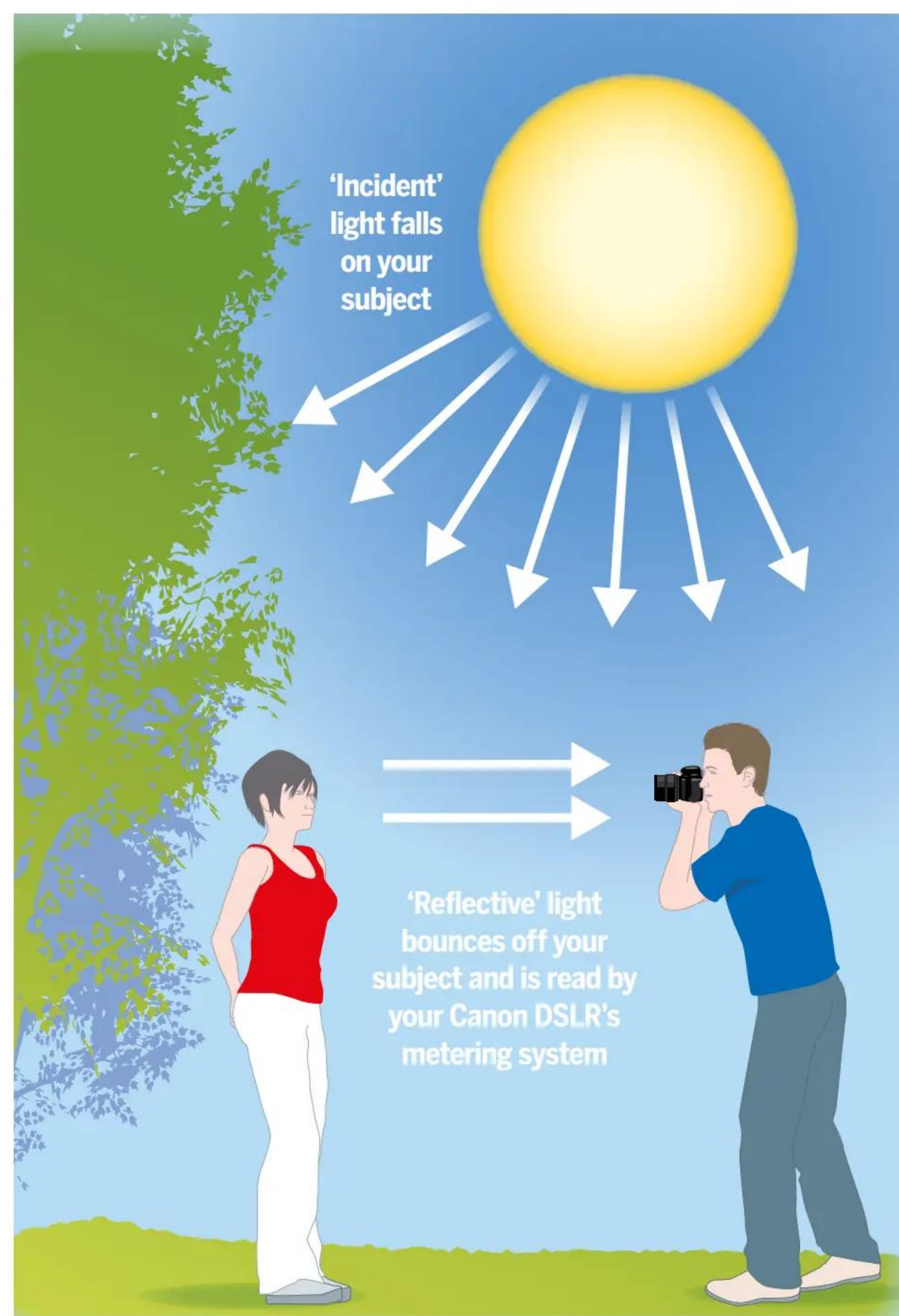
Metering is the way in which you and your Canon DSLR decide on what the exposure should be for the image you want to capture.

Taking a reading of the light reflecting from a subject enables you and/or the camera to calculate a combination of shutter speed, aperture and ISO that will, hopefully, produce a correctly exposed image. All Canon DSLRs have a sophisticated metering system, and different metering modes enable the camera to read the light in a way that suits both the subject and the result you want to achieve. But metering can never be 100% accurate, as the quality of the light, and the way it's reflected, differs from scene to scene.

It's the word 'reflective', that's important. Light is

said to be 'incident' light if it's falling directly onto a subject. So your light source – typically the sun, although it could also be flash or studio lighting, is incident light, and this light can be read by an off-camera light meter.

When incident light hits a subject and bounces off it, it becomes reflected light – and it's this light that's used by the camera to calculate exposure. The metering system does this by assuming the world is a midtone grey, or at least that it has the same reflectance of 12-18% grey. Of course this isn't the case, which is why metering doesn't always work perfectly; different objects reflect light in different ways, and this is when your camera can give you an incorrect exposure, underexposing or overexposing an image or parts of an image.



Why different scenes can confuse the meter

THESE TWO IMAGES have been converted to greyscale to give you an idea of what the camera's meter is reading. There are no large areas of brightness or darkness in the tree image, so a midtone grey metering won't trouble any of the metering modes and will give a fairly accurate exposure. The gondolas image is different. There are large areas of

shade in the foreground, plus a large, bright sky. Not only is this likely to fool the meter; the scene may also fall outside the camera's exposure latitude. For example, a 6D has one of the best exposure latitudes of any DSLR, but it can still only cope with approximately 11 stops of light before either underexposing or overexposing parts of a scene.





Metering modes

Learn the four different metering modes in most Canon DSLRs

Your Canon camera typically has four metering modes: **Evaluative, Spot, Centre-weighted average and Partial (the 1200D doesn't have Spot mode)**. The default metering mode is Evaluative, and this 'catch-all' mode is

used when you take a picture in any of your camera's auto shooting modes. It takes a series of light readings from different points within the frame and averages them out. To show you how the four modes work here are a series of portraits, all taken with the

model standing in the shade. Each image was taken at the same focal length, at f/2.8. Each metering situation is different and therefore it's impossible to say which mode is best, but as you can see from these examples there's little to choose between Partial

and Centre-weighted average for this scene, although none of the modes has completely let the side down. Evaluative has done a pretty good job too, which supports the notion that when you want to hedge your metering bets it's a sensible option to choose.

Evaluative



Evaluative does a good job, although it's biased towards the zone where the AF point is, as the meter assumes this is the most important part of the scene. It has come up with a 'best of all worlds' exposure: the model's face is only slightly underexposed, and the bright foliage is toned down.

Partial



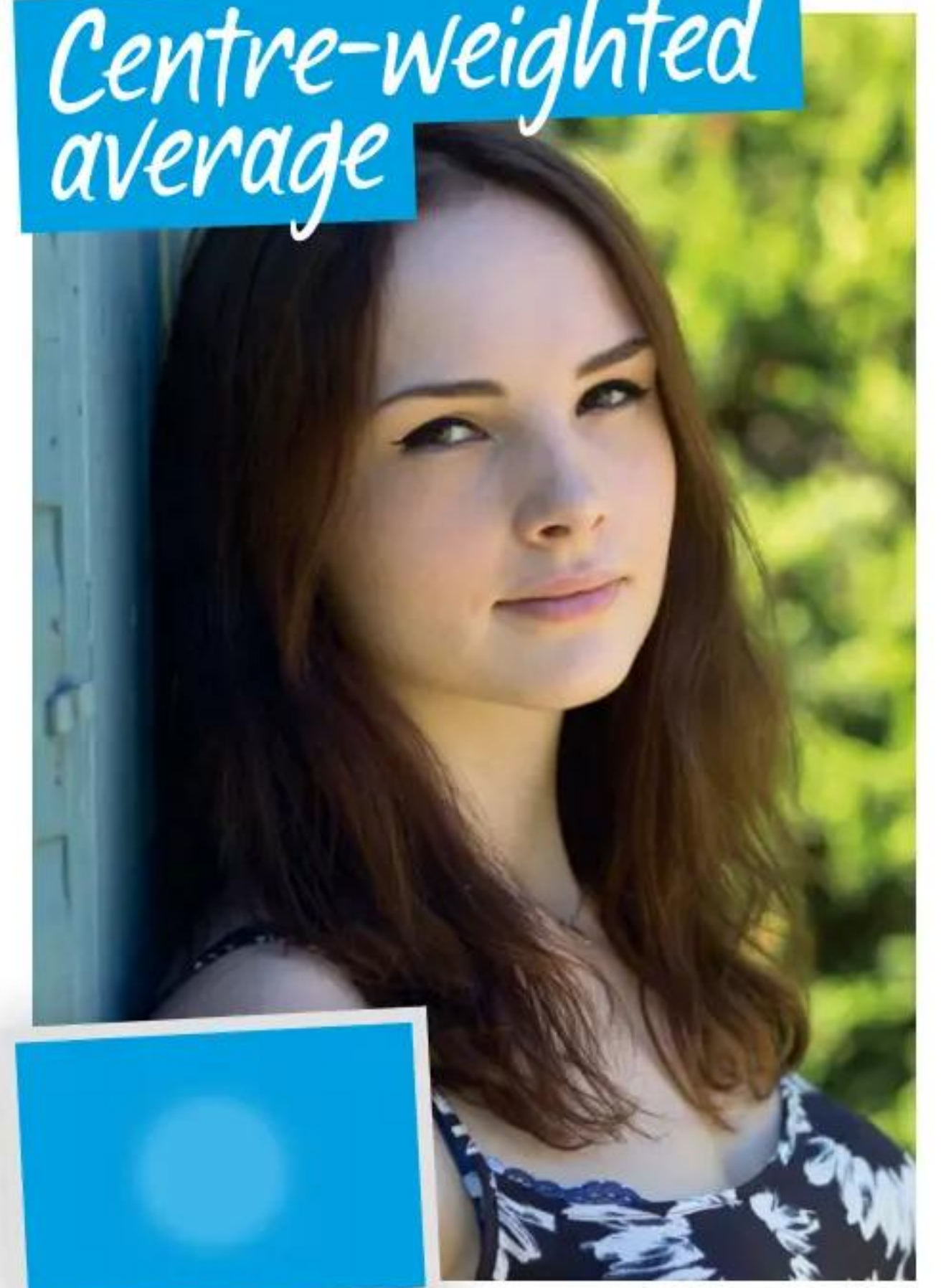
As the meter reading is taken entirely from the face area in this shot, the exposure is very much biased towards the skin – exactly what we'd want in a portrait. However, this also means that the background remains bright, although it's certainly not overexposed in this area.

Spot



As Spot metering only takes a reading from a tiny area of the face in the middle of the frame it produces an image that's slightly underexposed, with detail lost in the shadows of the hair. But it's not far off, and Spot is a good option if you want to be precise about the area you meter from.

Centre-weighted average



Centre-weighted average has given us a halfway house between the exposures achieved with Spot and Partial, which isn't surprising when you look at the area it's metered from. The resulting exposure is very good in this case, with a lighter face and some hair detail preserved.

Meter from an AF point

You can link Spot metering to a single or group of moveable AF points if you have Canon's current top of the range pro camera, the 1D X, or any of the earlier 1-series cameras. But while this sounds like a great idea in principle, unless you're careful your exposures can be way off the mark. Whether you're selecting just one AF point or a group, the metering is still only taken from a 3% area of

the frame, so where you're metering from is critical. If the point you need to focus on is very dark, for example, you could end up with a slower shutter speed than you want, and an overexposed image. Conversely, if the area your AF point hits is very bright, the rest of the image will be too dark. However, this option can prove useful, as these two



Evaluative



images show. The darker image was taken with Evaluative metering, and although the camera has attempted to balance the scene, the tricky backlighting isn't helping. However, with

Linked to AF



Spot metering linked to AF, and the AF point positioned on the boy's darker top, the resulting exposure is better balanced, with more detail visible in the subject.

Exposure compensation

Dial in more or less light to get the perfect exposure

As sophisticated as Canon's metering systems are you'll sometimes need to help the camera get things right, and you can do this by using exposure compensation.

On most entry-level and mid-priced Canon DSLRs, to dial in exposure compensation you press the +/- Av button and then turn the command wheel to the right (plus) or left (minus). However, the high-end enthusiast and pro Canons don't have a +/- Av

button; you simply turn the rear command wheel to dial in exposure compensation. For experienced users this becomes second nature, but if you're a beginner it can take a little getting used to; simply remember that it's 'right for light' and left for dark.

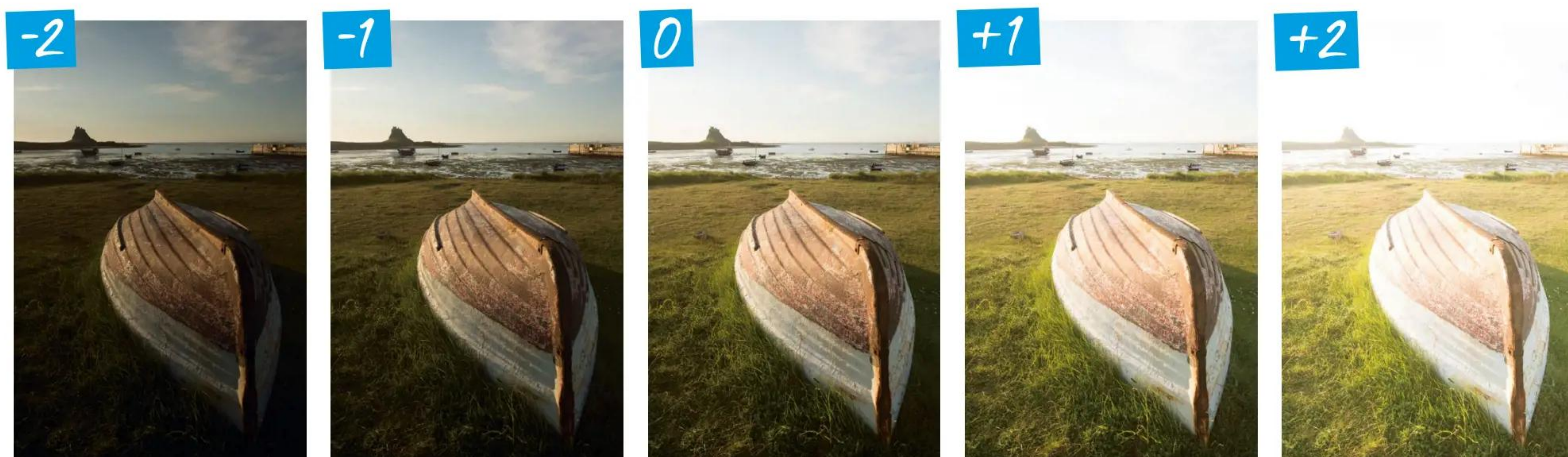
You can only dial in exposure compensation in the semi-auto modes: Shutter Priority, Aperture Priority and Program. You can't use it in any of the fully automatic shooting modes, or full Manual

mode.

Your camera enables you to compensate by up to plus or minus five stops, and the increments in which this can be done varies from model to model. As a rule of thumb, third of a stop increments will give you more precise control over the exposure.

You can use exposure compensation with any of the metering modes, although you may find it's more often required with the more

area-specific modes, such as Partial and Spot. In the examples below, -1 stop of exposure compensation brings out detail in the sky, but underexposes the foreground, while +1 gets the foreground right but blows the sky; the default exposure strikes a reasonable balance, and if you shot Raw you could recover both highlight and shadow detail in post-processing.

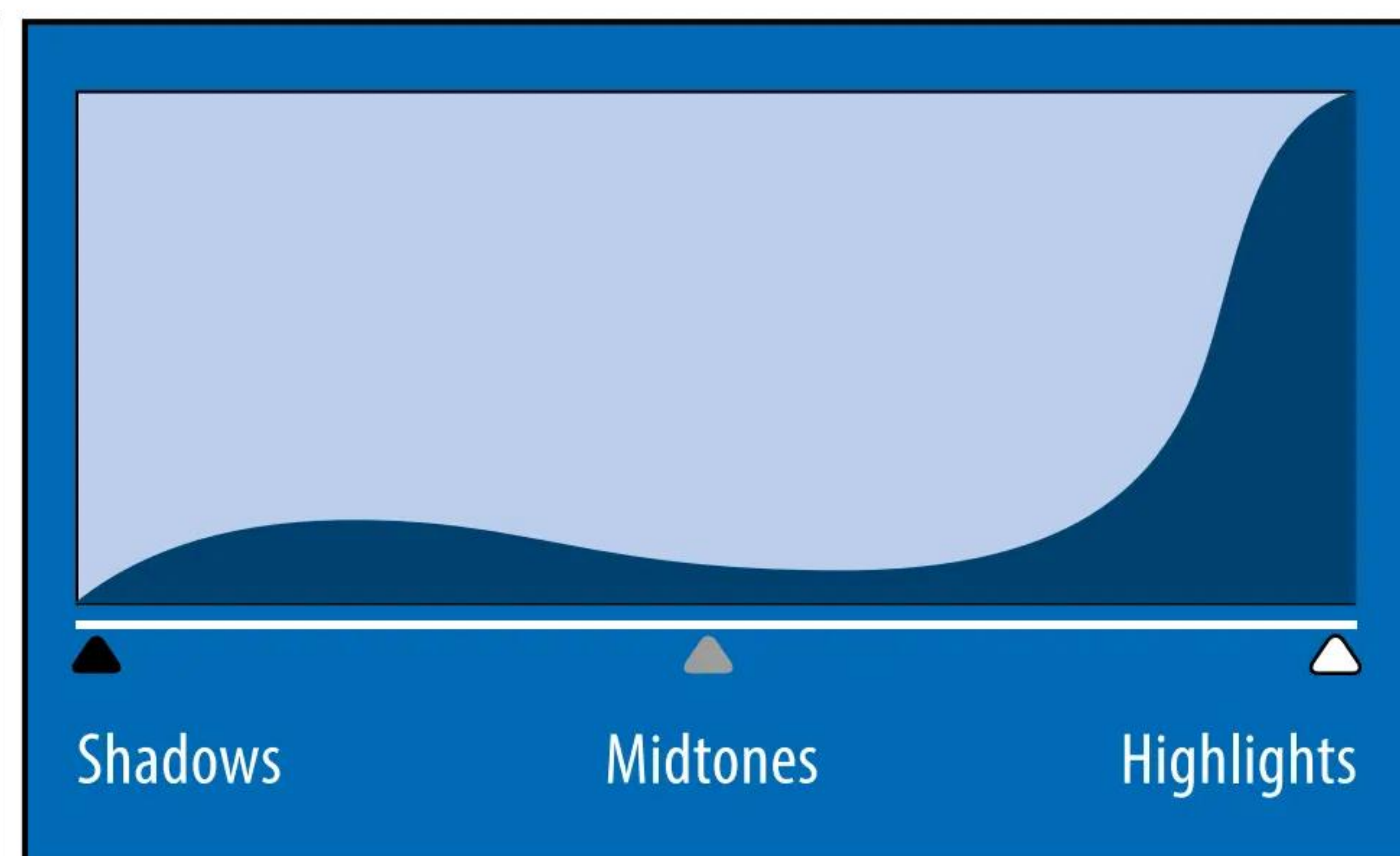


Assessing the histogram

How to tell when exposure compensation is required

We've already talked about histograms in the 'exposure' lesson, and how useful they are for exposure assessment, so this is just a reminder that they can be used in conjunction with exposure

compensation. In brief, a histogram is simply a tonal representation of your image, and the graph you see when you press the Info button on your DSLR when reviewing images can give you a precise indication of whether you're underexposing or overexposing your photo. There's no such thing as a 'perfect' histogram, as each image has a different tonal range (see our high key image and histogram), but it's important to look out for areas that are totally underexposed



The histogram for our high key portrait (left) looks similar to that of an overexposed image, but in this case we're deliberately clipping highlights

or overexposed. These will show as pixels stacked flat against the left (shadows) or right (highlights) edge of the histogram. By using exposure compensation you can move the

tonal range towards the left or right as desired. You don't need to look at the histogram of every shot you take but, it can be very handy, especially in tricky lighting.

BRACKETING & HDR

Auto bracketing

Shoot a sequence of images at different exposures

As well as dialing in exposure compensation manually, you can also set your Canon DSLR to automatically bracket exposures. When using exposure bracketing you set up the camera so that it will capture (typically) three images: one exposed darker

than metered, one lighter and one at what the camera thinks is the correct exposure. The bracketing 'spread' can be adjusted, and in most high-end DSLRs you can also choose the sequence in which the exposures are captured; one correct exposure and two 'over' for example. Some pro cameras, such as the

5D Mk III, enable you to adjust the number of images shot. Why would you want to use bracketing? Well, for a start it's a simple way of hedging your bets, working on the principle that one of the three exposures will be perfect, or close enough that you'll be able to recover sufficient shadow or highlight detail in post-processing. Alternatively, you may want to shoot three images to expose for a greater dynamic range



than can be captured in a single frame, with the intention of merging them to create a high dynamic range image. Either way, it's not really a technique to use for subjects that move, and if you want to merge exposures then your camera must be in the same position on a tripod for all three shots, or the images won't align perfectly.

Bracketing exposures enables you to create HDR images that capture detail from deep shadows to bright highlights in high-contrast scenes



In-camera HDR is very effective as long as the camera is locked on a tripod – and provided you stick with the Natural effect

In-camera HDR options

Create a high dynamic range image the easy way

While you can use exposure bracketing to capture a series of differently exposed images to blend together in post-production, newer EOS DSLRs – such as the 7D Mk II, 5D Mk III, 5DS and 5DS R – enable you to capture and process the files as an HDR image in-camera.

Although it's an automatic mode, you can choose the amount of exposure bracketing applied, and the style of blending that's used. Most of the blending comes strictly from the 'over the top' drawer, so if you want to use in-camera HDR then stick with

Natural as your setting, unless you have a particular liking for the over-processed images created by using Art standard, Art vivid, Art bold or Art embossed.

There's no doubt that in-camera HDR works, and it's a no-fuss way to get that popular HDR look. However, you don't get as much control as you would by shooting a series of frames with different exposures and then blending them with software on your PC. When blending images, the in-camera software relies on each frame being taken from precisely the same point, so it's essential to use a tripod. But you can shoot handheld

with fast shutter speeds, and the camera will attempt

to align the three frames. Note that the in-camera HDR images end up cropped so allow for this in your compositions. Plus the HDR image will only be saved as a JPEG, although you can save the three originals Raw files.



Lock the exposure

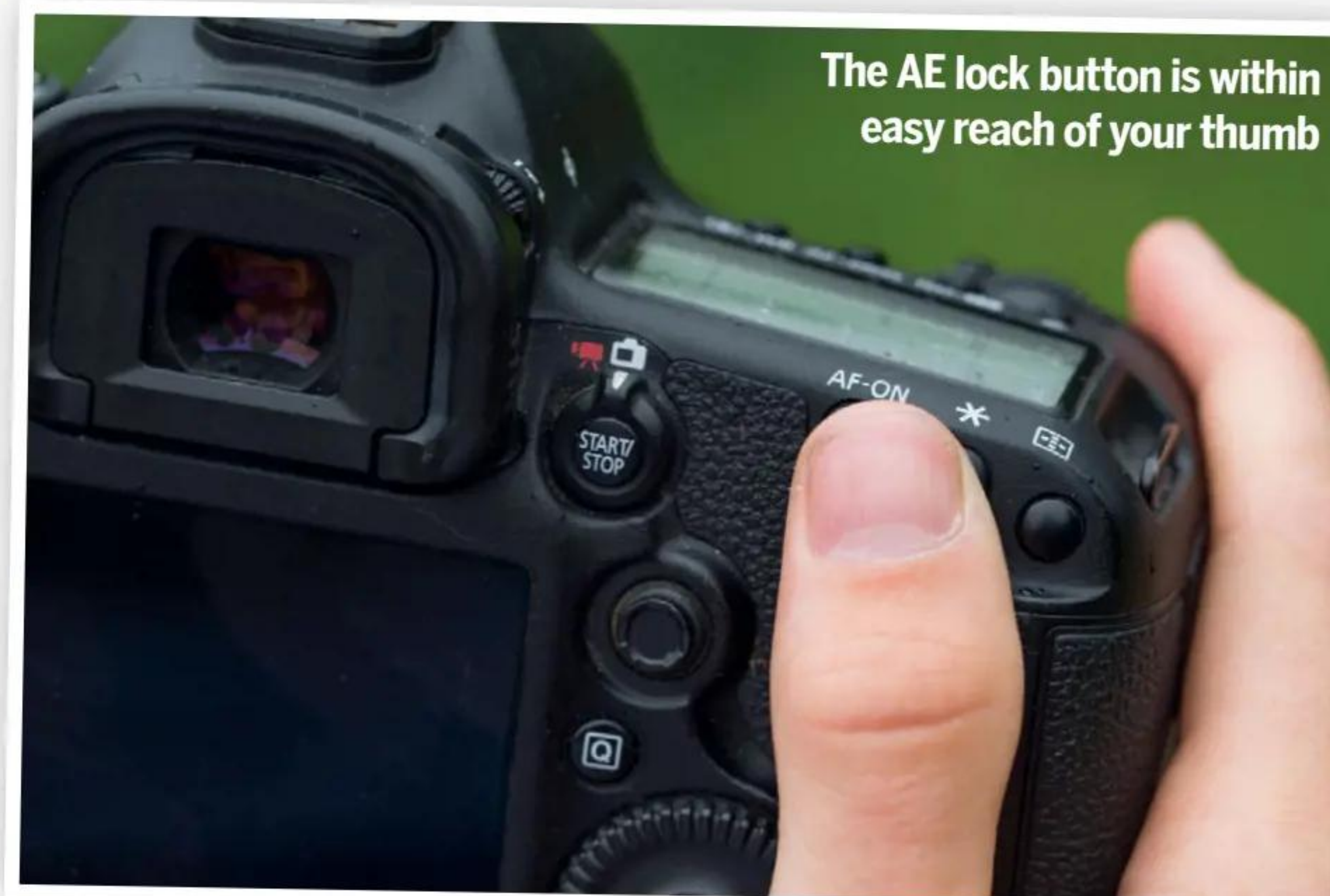
Use the AE lock button to 'save' an exposure

The AE lock function on your Canon camera is a useful way of 'saving' an exposure setting while you recompose a shot, and it's well worth familiarising yourself with this feature.

The AE lock button is on the back of the camera, usually on the upper right-hand side, and it's marked by a * symbol. It's easily operated with your thumb, and when you press it the camera will store the

metered exposure until you take the next shot; if you want to lock the exposure in for several frames it pays to keep the button pressed, or the exposure may drop out.

Using AE lock you can, for example, point the camera at and meter from a midtone area of a scene (pavement, grass, etc) to give you an average exposure, then lock that exposure in while you reframe and take the shot. Without AE lock, when you're



in Aperture Priority or Shutter Priority modes, once you've recomposed a scene the camera will alter the exposure according to the

change in reflected light; if it happens to meter from a very bright or dark area then the resulting exposure may be way off.

Go Manual

How to take full control of your exposures

When you want to take full control over exposure settings, Manual mode is the way to go. In full Manual mode – M on your DSLR's command dial – you set the shutter speed and aperture independently of one another, using the command wheels on the back and top of the camera.

The only 'help' the camera gives you is to indicate when it thinks the exposure is correct, by placing the point on the exposure indicator bar in the centre of the scale. Using full Manual mode is easy as long as you've grasped the relationship between shutter speed, aperture and ISO, and know which is the most important element within the 'triangle' for you to get right. In other words, if front-to-back sharpness is required for a landscape image, then aperture will be your starting point. Set a narrow aperture, such as f/11 or f/16, and then see what shutter speed you



need to set. Conversely, for an action shot of some sort, shutter speed will be your prime consideration. Manual isn't necessary for every shooting situation.

A lot of the time I'll shoot in Aperture Priority mode, but there are occasions when I'll want the complete control of Manual, such as when taking

landscapes, shooting in a studio environment or for any general shots where the exposure is particularly tricky, such as the above shot of the hare sitting in his snow hole.

Remember, in Manual mode whatever exposure you dial in is fixed, even if you recompose a scene. This isn't the case in either of the semi-automatic

modes, where you need to use the AE lock button (above) if you want to hold an exposure in place when you move the camera.

Of course, just because the indicator is in the centre of the exposure dial it doesn't mean the exposure is correct, so be sure to check exposures, using the histogram as a guide.

EXPOSURE WARNINGS

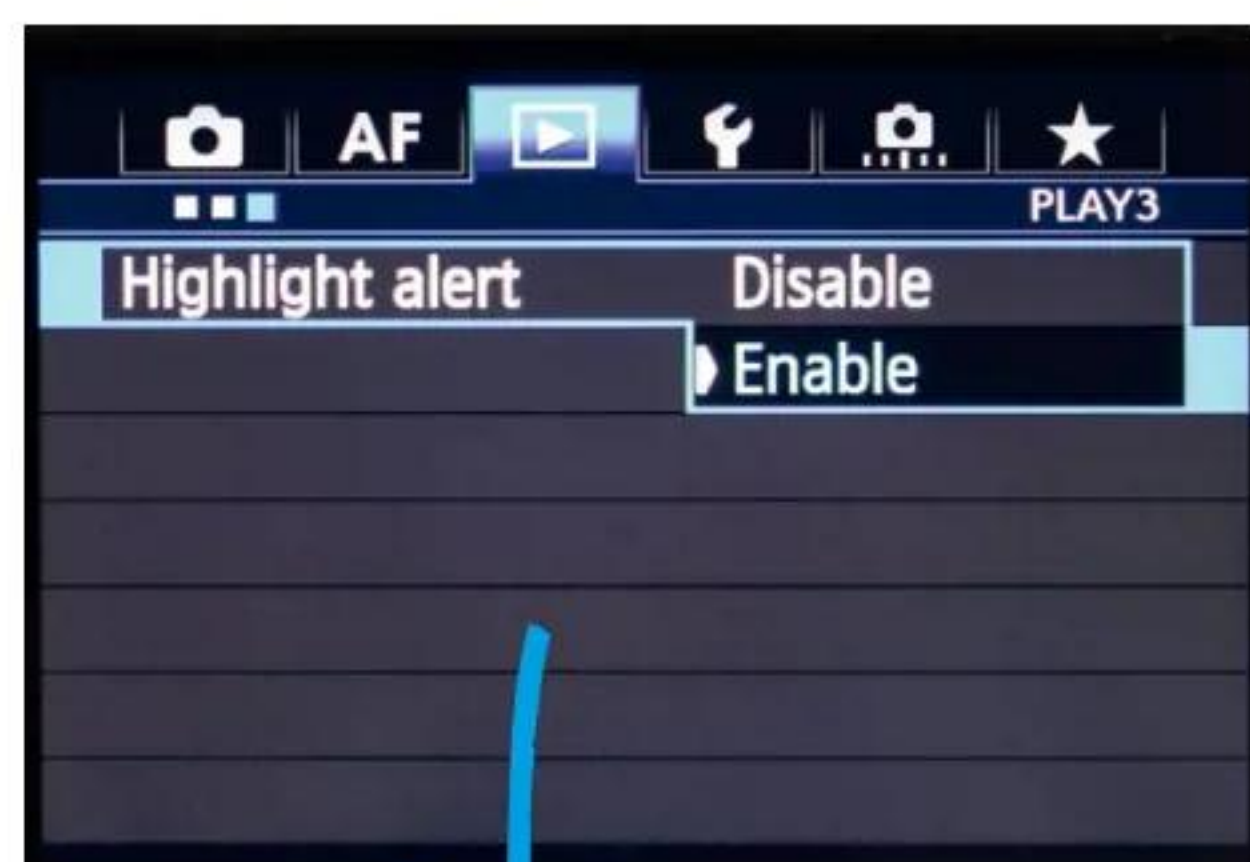
Be alert to overexposure

Use the Highlight alert to keep detail in bright subjects

The Highlight alert is a very useful function for those who are getting to grips with understanding exposure but are making a few mistakes along the way. In most of the current EOS DSLRs you can have Highlight alert disabled or enabled, and if you find that you're consistently overexposing images I'd recommend that you enable it immediately. The LCD screen provides a preview of the image you've just taken, but it's not always easy to see that image, especially in bright conditions. I often resort to finding shade, or even sticking the camera under my shirt to review the image on the screen! Even then the JPEG preview isn't a 100% accurate reflection of the image you've just taken. This is why, especially in tricky, bright conditions I'll enable the Highlight alert, so that any areas of an image where the highlights have pushed too far to the right will blink black in the LCD screen as another visual indication of overexposure. If I see the screen blinking like this I'll double check the

degree of overexposure by referring to the histogram, then dial in the required amount of negative exposure compensation.

I've found that sometimes, although the Highlight alert is blinking, the histogram shows that the highlights are within the acceptable range, so



don't assume that detail is always totally blowing out – just check to ensure that you're in control of the exposure; remember, sometimes you may be quite happy to blow some highlights as long as the main subject is exposed correctly. It also very important to bear in mind that if you're shooting

Raw and you overexpose an image slightly then you can usually pull the detail back into the image in post-production, as long as it isn't drastically bright in those areas; if you shoot JPEGs there's much less chance of retrieving lost highlight detail. Raw files retain far more image data than a JPEG will.



Preserving the highlights is important in bright and finely detailed subjects such as flowers

School tip Auto Lighting Optimizer

Use ALO to balance exposures by enhancing shadow detail

WHEN YOU'RE SHOOTING JPEGs in harsh lighting it can be useful to enable the Auto Lighting Optimizer. This has been available in all Canon EOS DSLRs since 2008, and is designed to even out exposures so that the overall image is better balanced. There are three ALO settings, as well as the option to disable the function. These are

Standard, Low and Strong, with Standard being the default mode and certainly the most useful. It works by bringing out the shadow detail, although if you're not careful it can do this at the expense of pushing the highlights too far. Generally, you should stick with the Standard setting, and keep a check on highlight detail by looking at the histogram.



The importance of white balance

Why you shouldn't always rely on Auto WB

White balance is **easy isn't it?** You just stick it onto Auto WB and let the camera take care of the rest? Well, you can take the lazy approach, but you will get much better results if you understand a little bit more about colour temperature.

The simple truth is, white balance really is the thing that many photographers choose to ignore for 99.9% of the time; especially if they are shooting Raw because, even if they get it wrong, it's easy to correct in post-production. I confess this was also my attitude for a long time but these days I pay a little more attention to it, and this pays dividends in fewer colour casts and less laborious correcting in software.

Your Canon DSLR comes with a whole range of different white balance presets and you can create your own custom ones too, so with all this technology at our fingertips it's only right we work out how and when we should be straying beyond Auto WB.

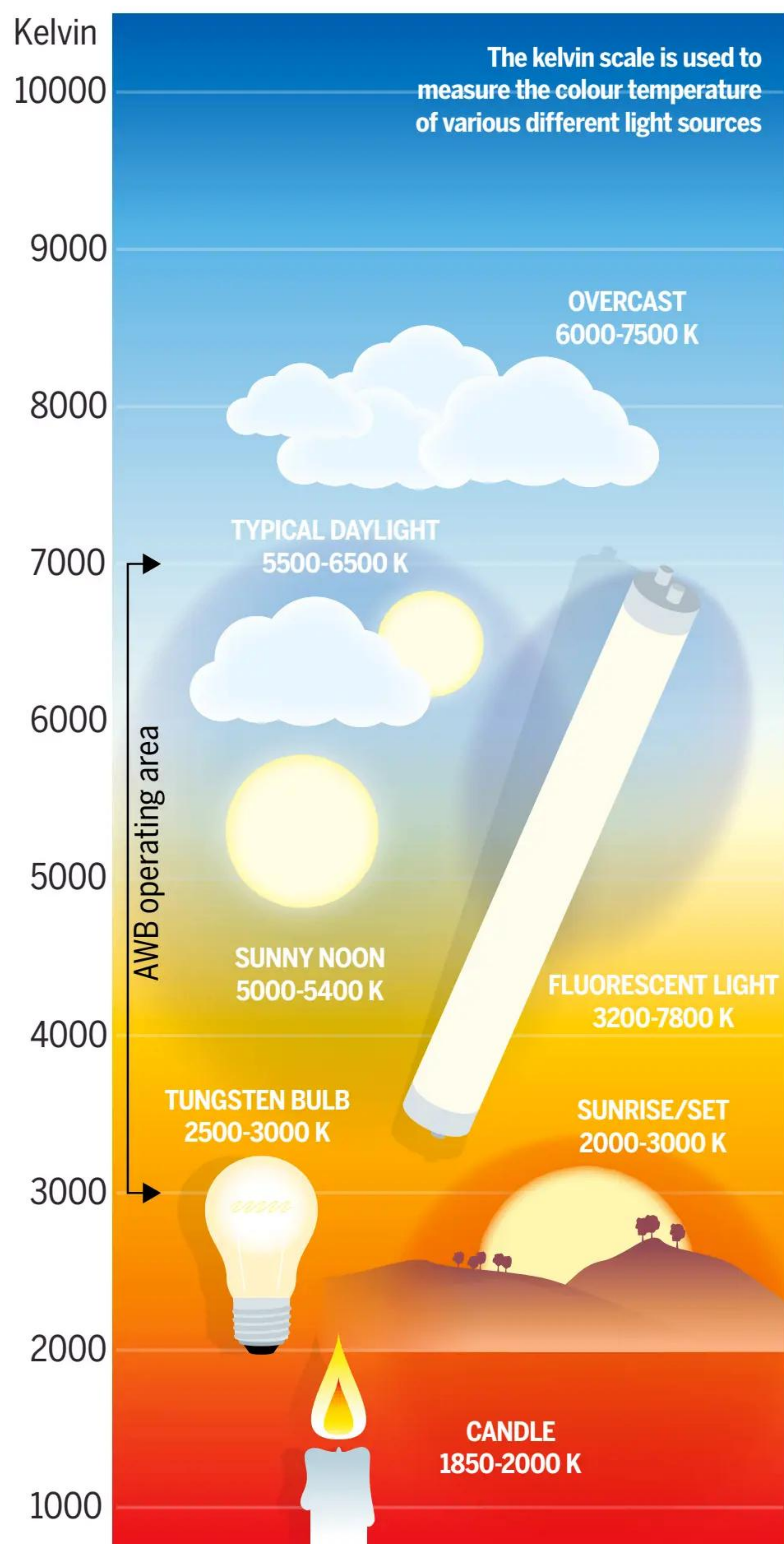
It's also worth pointing out that post-production WB settings don't necessarily exactly match in-camera ones, unless you are using Canon's own Digital Photo Professional software. If using third-party Raw conversion software, such as Lightroom or Adobe Camera Raw, then it is the 'As Shot' setting that will show how the camera captured the WB, rather than the equivalent slider for Daylight, Shade, Tungsten and so on.

Kelvin scale

Colour temperature is measured in kelvins, named after William Kelvin, a scientist from the late 1800s who essentially created a scale of temperature that starts at absolute zero – that's -273°C. The reason that this is

relevant to us is the 'temperature' of light changes depending on the source and, if it's that big light source in the sky, called the sun, it changes at different times of the day. So, to shoot a picture where the colours don't look wrong, we need to ensure our white

balance is suited to the conditions. You won't notice the more subtle changes in colour temperature because the human eye is amazingly good at adjusting for it. Your camera isn't, though, which is where WB settings or adjustments come into their own.



WB PRESETS

White balance settings

What effect do those different presets have?

The effect different white balance settings have on an image largely depends on the temperature of the subject and the colours within it. This series of shots, taken in daylight on an overcast day using a Canon EOS 5D Mk III, will give you an idea of how different WB settings introduce different colour casts or, used in the right circumstances,

neutralise them. Naturally, some of these temperature changes are subtler than others. In order to manually select a white balance preset, you must be working in the Creative Zone on your EOS camera, so that's P (Program), Av (Aperture-priority), Tv (Shutter-priority) or Manual (M). In all of your camera's automatic settings, the white balance will default to Auto.



Auto WB

AWB 3000-7000 K
As you can see AWB doesn't have a fixed temperature but the camera will estimate the correct temperature within broader parameters. In this case it has chosen 5950 K. Auto white balance works best when the scene isn't dominated by one colour, but for a mixed scene like this it has performed reasonably well. There's nothing wrong with using AWB; just be aware it can get it wrong sometimes.



Shade WB

 **7000 K**
At this white balance more warmth is added to the image and the whites have a strong yellow hue to them. It doesn't look right with this photo but if you want to give your photographs a distinctly warmer appearance then Shade is the go-to WB. Be warned, though, it can also look unnatural if overused or used in the wrong conditions.



Flash WB

 **Automatically set**
Naturally you'd normally use Flash white balance when using a flashgun, but set it without and it tends to give a quite a neutral result. Here it has given us 5500 K – only a miniscule amount warmer than Daylight white balance and it is, at least for this scene, a reasonable choice, although Daylight WB has done a better job.



Cloudy WB

 **6000 K**
At 6000 K, the image has been very slightly warmed up compared to AWB. It's very subtle so you may barely notice it but Cloudy white balance has given us a step up in warmth, adding a slight yellow tone to the image that doesn't work in this instance but could help to make some scenes, such as a sunset or sunrise, look more inviting.



Fluorescent WB

 **4000 K**
Fluorescent WB is designed to balance artificial fluorescent lighting and so our outdoor shot takes on a distinct blue cast that cools the whole frame down and looks very wrong. While it would help to balance an indoor scene lit by fluorescent bulbs, fluoro lighting has varying temperatures, so it's not 100% successful in neutralising casts.



Daylight WB

 **5200 K**
The most obvious WB to set for this image is Daylight, and the result is slightly cooler than AWB. This certainly looks the most natural for this particular shot because the whites are, indeed, whiter! This is the go-to WB when shooting outdoors in average or typical lighting conditions. Indeed, I use this as my default white balance, rather than AWB.



Tungsten WB

 **3200 K**
This indoor setting further cools down our daylight image with an even more pronounced blue tone. But used indoors when the scene is illuminated by a tungsten lamp it will do a very good job at neutralising the yellow light that's being emitted. It can have its moments outdoors too – when using it will enhance the mood of an image.

Setting kelvin manually

For ultimate accuracy set your own temperature

0 n some EOS cameras you can also dial in your own specific kelvin temperature. This is a feature that is ignored by most photographers but it is an option if you want to be very picky with your white balance. For example, if you know the typical temperature of a scene then you can set that manually in kelvin to try and neutralise any potential colour cast.

For example, a candle typically emits a colour temperature of 1900 K or

thereabouts. The image taken using AWB gives us a strong orangey glow and a temperature of 3200 K. But switching to K on the camera's white balance settings and simply dialing in the lowest manual kelvin setting of 2500 gives us a more neutral result.

You may prefer the warmer glow of the AWB result, but the option to set specific kelvin temperatures, and reduce or remove colour casts, is there should you need it.

I find this really useful when using a filter like the Lee Big

Daylight WB



Stopper. This filter tends to add a strong blue cast to an image, but if I manually set the

Manual WB: 2500 K



kelvin to 10,000 when I take the shot, it largely resolves this issue.

Custom white balance

Go Custom for near-perfect results every time

S etting a Custom white balance is a bit of a faff and there are many shooting situations where it just isn't practical. However, in some situations, where you have time and lighting isn't likely to change much, then it is worth doing because it gives practically perfect results straight out of the camera. The camera makes a series of calculations based on the scene and then works out what temperature it needs to shift in order to remove any colour cast. In other words, anything that is supposed to be white will be white and the rest of the colours should be totally natural. Here's how to set a Custom white balance:

1 Get a piece of white card (you can also use grey) or a purpose made white balance checker. Place this in the middle of your picture so that it fills a reasonable amount of the frame – it must fill the centre spot circle you see in the middle of the viewfinder. Now adjust your exposure to the scene and take a photo. At this stage it doesn't matter what WB you have set – you can use anything!

2 Go into your camera's menu system and find the Custom WB setting (on the 5D Mark III it's in the red Shoot2 menu). Go into it and select the image you've just taken with the white card/WB checker in the frame and

press Set. The camera will ask you to confirm this is the image you want to use so hit OK. Once that's done, all you have to do is select the Custom white balance preset and take your photo – this time without the white card showing.



SHIFT & BRACKET WB

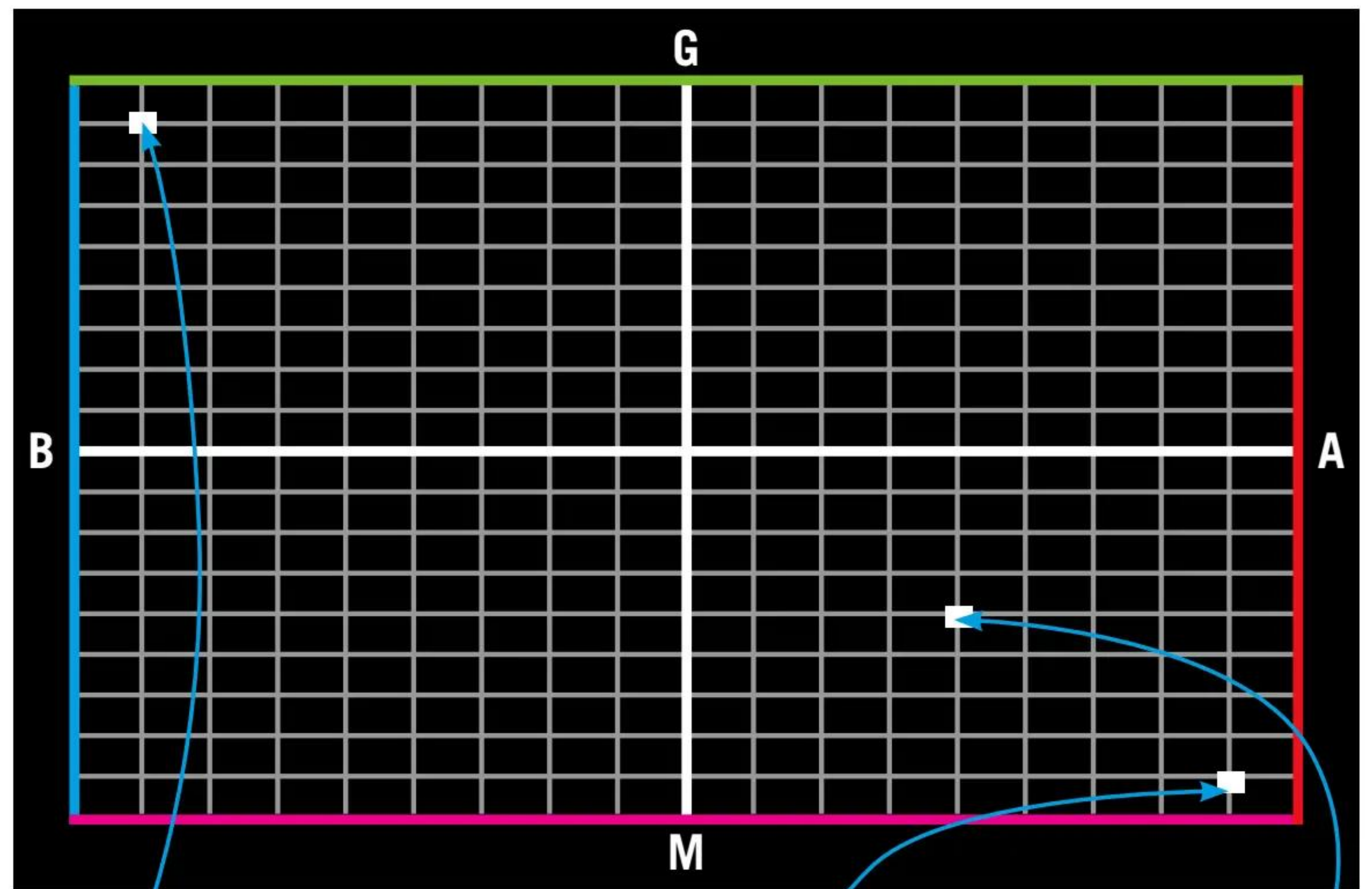
Shift your white balance

Tweak the temperature to suit the image

All current Canon DSLRs enable you to manipulate the white balance at the taking stage beyond simply dialing in a WB preset – or setting a Custom WB – with the WB Shift/Bkt feature. It allows you to manually move white balance along Blue/Amber and Green/Magenta axis.

White Balance Shift can be confusing and is best used only if you are shooting in a particularly tricky WB situation. For example, if you

find your image is looking too blue, you can Shift the WB in nine increments towards Amber for a warmer image. With some experimentation you should be able to get the exact WB you want. You can move the white balance point to anywhere within the Blue, Green, Amber and Magenta range – although obviously if you go to the extremes you can expect to end up with similarly extreme results.



WB shift B9/G9

An extreme shift to blue/green makes things even worse, and introduces a truly horrible colour cast.



WB shift A9/M9

Manually shifting the temperature to the bottom-right has produced an overly warmed up image.



WB Shift A4/M4

But a four-step shift to Amber 4/Magenta 4 warms the image up slightly and gives a much better result.

Bracketed white balance

For tricky light, hedge your white balance bets

This isn't a function I've ever found a huge amount of use for as I shoot Raw all the time, so bracketing a Raw file seems like overkill.

However, if you shoot JPEGs and don't want to be bothered with a Custom WB, then this is one answer to tricky light conditions. The image will bracket in either the Blue/Amber or Magenta/Green directions in three steps, and all three images will be created with a single press of the shutter button.

The first shot is the standard shot at the preset WB you have set. The next shot will be towards Blue or Magenta, and the final one Amber or Green. You can see this in the three example images. The standard shot was taken on Auto WB, but next two images show a distinct cooling or warming of the image.



Standard



Cooler



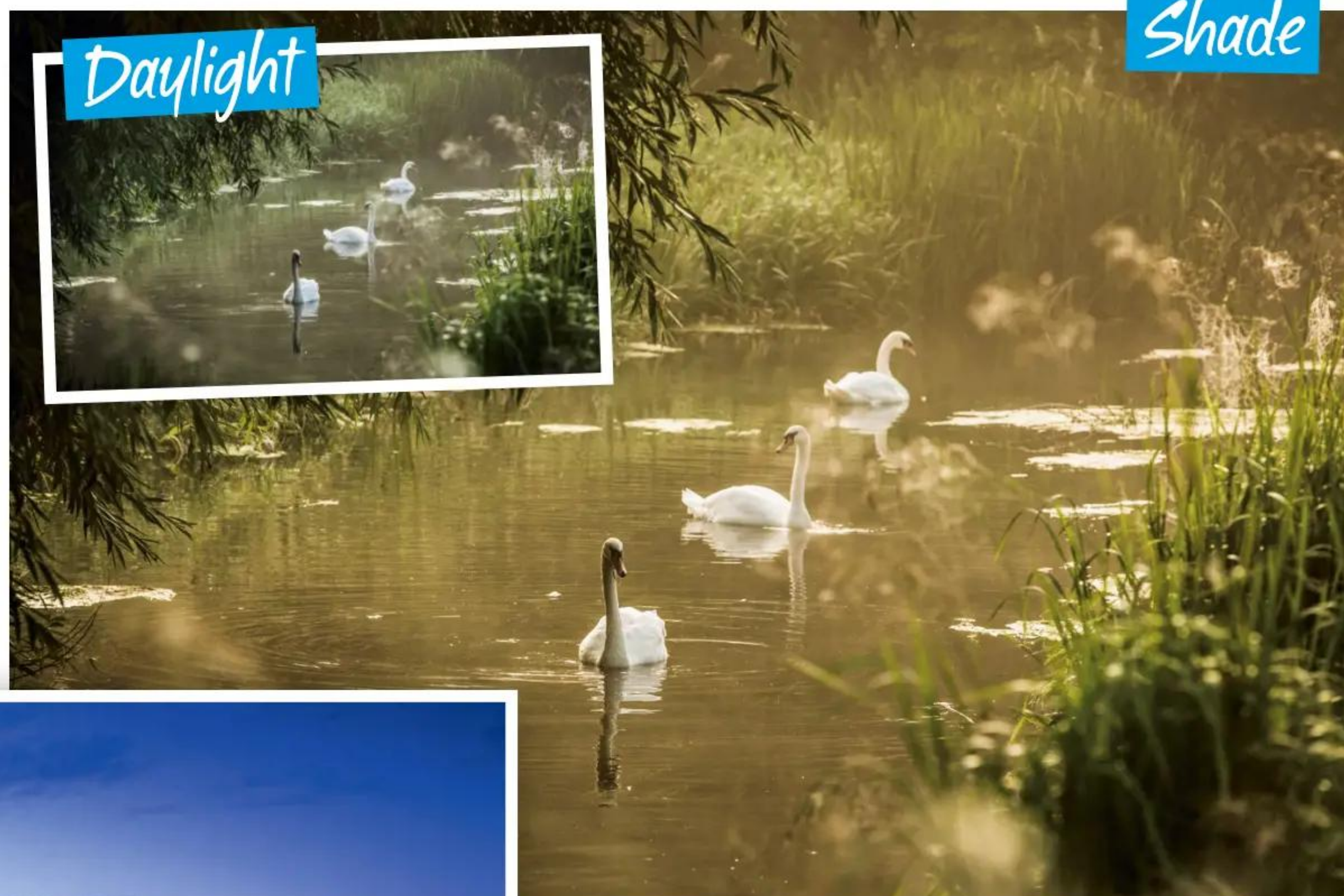
Warmer

Use white balance creatively

Use temperature to enhance mood

So far we've mainly talked about using white balance to get rid of unwanted colour casts that make the image look unnatural. However, there is a creative side to manipulating colour temperature to give your images a new look by deliberately accentuating an 'incorrect' colour tone for added impact.

If you're shooting Raw then you can do this at the post-processing stage, but again, it's worth trying some of these techniques at the taking stage too because they are fun to do and quite satisfying when you get them right.



▲ Inject some warmth

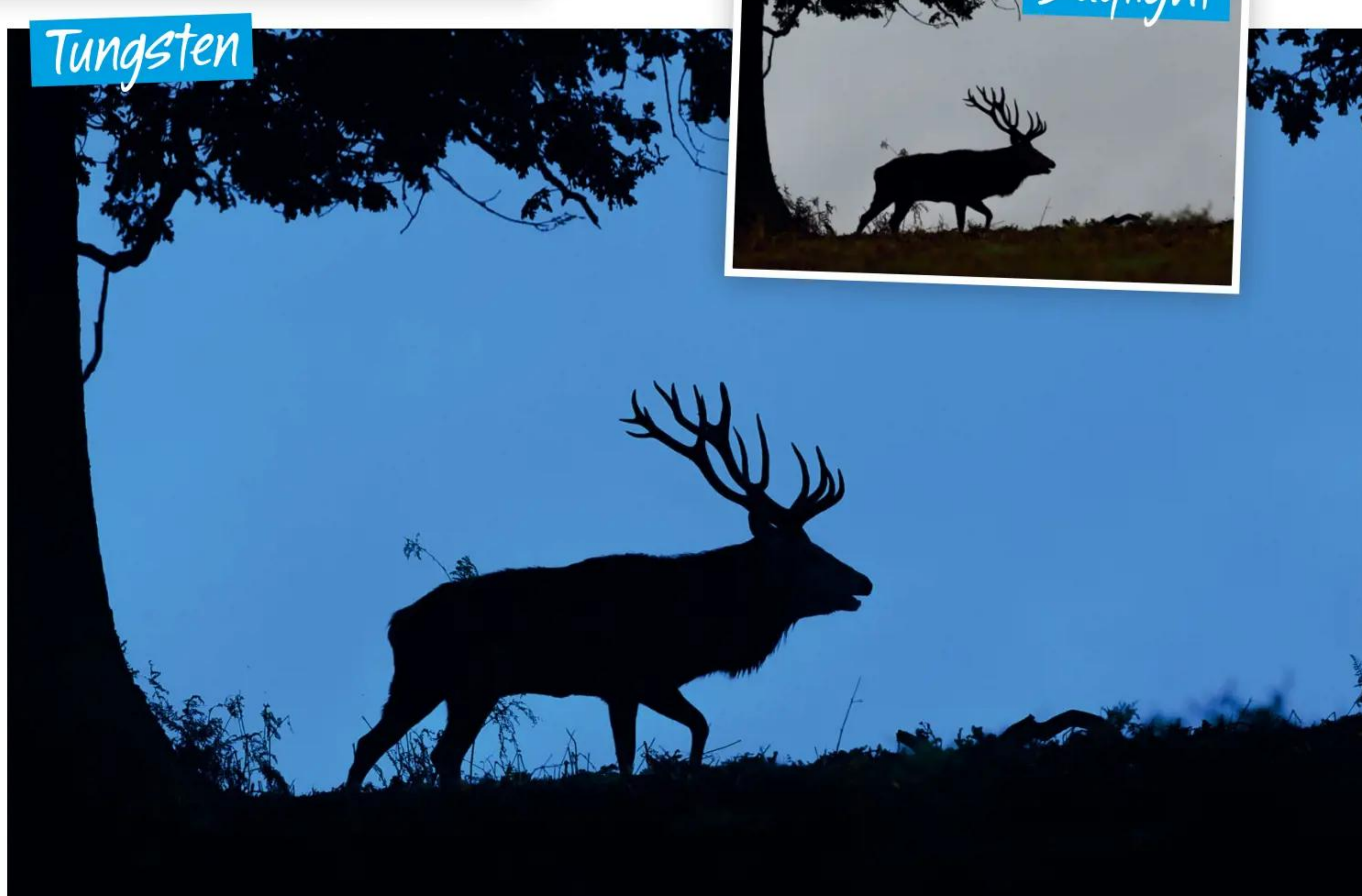
Using Cloudy or Shade WB will warm your image up significantly, with Shade delivering a much stronger orange cast over the image. If you do this in the middle of the day, this cast can look wrong, but try it at either ends of the day and you can certainly breathe extra life into your photos. The first attempt at capturing these swans swimming on the river at first light was taken using Daylight WB. The morning light was surprisingly cool, so a switch to Shade WB really warmed the whole scene up and made it much more inviting.

▲ Liven up landscapes

I'd hoped for some interesting colour in the sky when taking this landscape but sadly, as often happens, the faint glow of warmth on the horizon never really developed. Shooting with the white balance set to Daylight produced a really grey image that I felt didn't have any impact. Switching to Fluorescent WB gave a much moodier result. Used sparingly this trick certainly can give a drab photo a lift.

► Striking silhouettes

Here's a technique to try if you ever get a chance to silhouette an animal but the conditions are, frankly, a bit dull and lacking in atmosphere. It was shown to me by wildlife pro and Canon Explorer Andy Rouse and can work a treat. Instead of just settling for that rather uninspiring sky, change WB to Tungsten. This temperature change can make a big difference as the cool colour tone and works well on the boring sky, but it only really works when shooting early or late.



WB IN POST-PRODUCTION

Fine tuning Raw files in post-production

Raw allows you maximum post-shot flexibility

While this month's Canon School has highlighted many of the in-camera controls for white balance, there is always the option to fine-tune temperature in post-production, whether you use Canon's Digital Photo Professional software or a third-party one, like **Lightroom**. And while I said at the start that using AWB isn't always the best option, there are occasions when you don't have time to keep checking colour temperature and need the camera to do a little bit of the work for you.

AWB gives reasonable results under normal daylight

conditions, although I've found that it tends to favour a slightly warmer tone.

On the occasions I use it, I usually find myself tweaking an image in post-production to get more of the mood I want, or simply to neutralise that slightly warmer cast AWB tends to deliver.

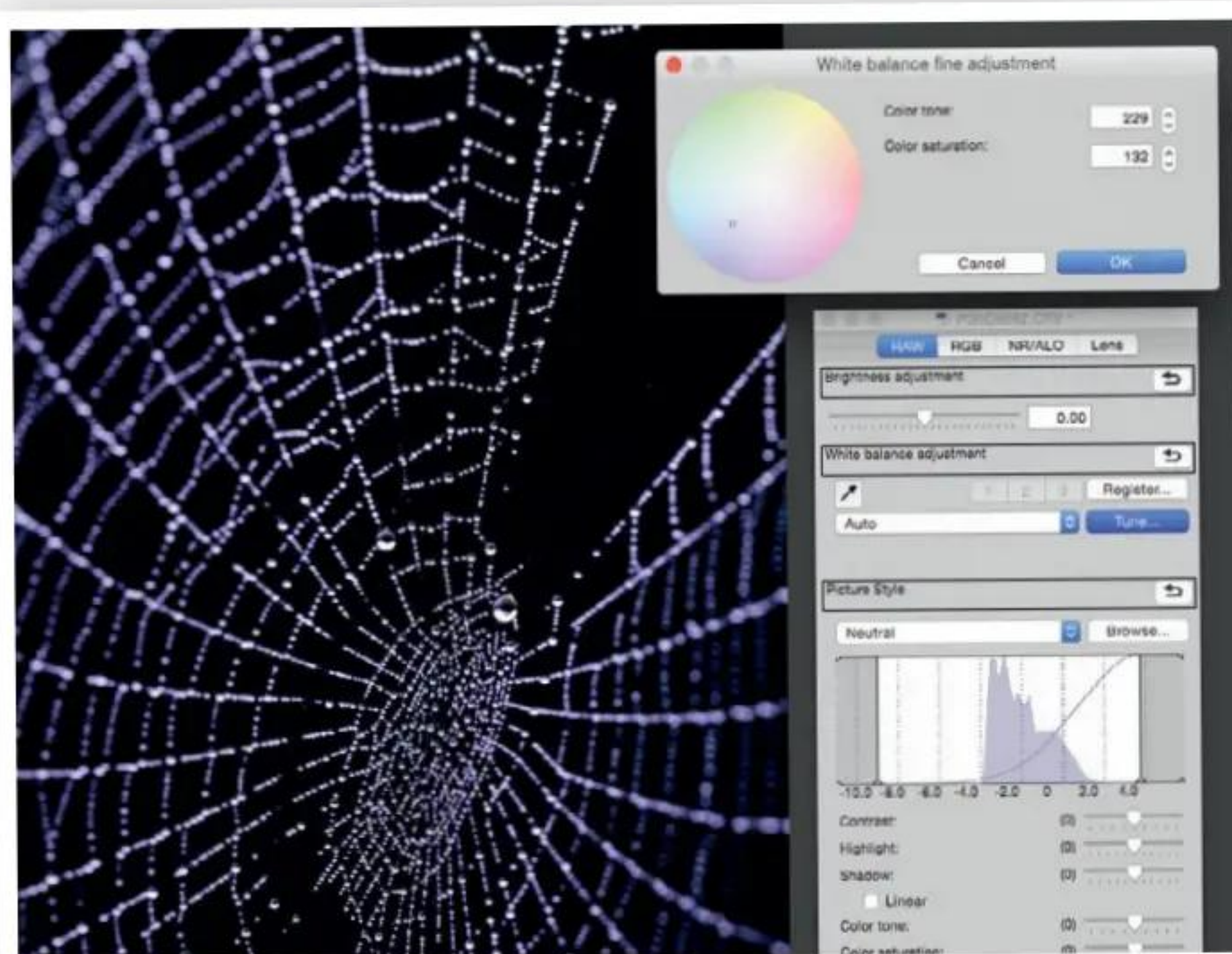
To take any colour bias out I use the White Balance Dropper, touching it onto anything that looks white within the image.

If I can't find a white point within the photo then I manipulate the White Balance Fine Adjustment In Digital Photo Professional, by moving the WB point around in the

circle. It's important that you have a calibrated computer screen so that what you see really is what you get.

It's also easy to use the White Balance Fine Adjustment tool to boost a tone, just as I've done here with this spider's web. Pushing the

Fine-tuning white balance in post-processing can have a dramatic effect



DPP's White Balance Fine Adjustment tool enables you to get perfect whites under tricky conditions

temperature towards the cooler tones and slightly desaturating the image at the same time gets a decent result. Remember, always relying on post-production to fix white balance mistakes caused by not paying attention

at the taking stage isn't the best approach.

Try to get WB correct as far as possible in-camera and then tweak or enhance your image for greater impact when using Raw conversion software.

School tip

Live View WB simulation

Get an instant assessment of white balance presets

IF YOU WANT an instant check on the difference one WB setting will make over the next then simply switch your camera to Live View. Just as you get exposure simulation in Live View, WB simulation shows the effect

of the WB presets so you can evaluate the look of different settings before you actually take the shot and thus decide which one is best suited to the scene. Depending on the model of EOS you have, you will either be able

to access white balance in Live View via its dedicated button or, if that doesn't work, press the Quick Control button (Q) and access it from there. Each of the WB presets will be shown on the Live View screen.



When shooting in Live View you can instantly see the effect of different WB presets

Awesome AF points

Autofocus setups and shortcuts to speed up your photography

Your EOS camera's three autofocus (AF) modes control how the camera focuses – whether it locks on or tracks and continuously adjusts the lens when it detects movement – but the AF points determine where the camera focuses, and how precise it is too.

As you might expect, the greater the number of AF points there are and the wider they're spread across the picture area, the easier it is to focus on subjects that aren't in the centre of the frame. A densely-packed array of AF points can improve the chances of getting sharp shots in sports and wildlife photography, as a moving subject is less likely to be in part of the frame that isn't covered by an AF

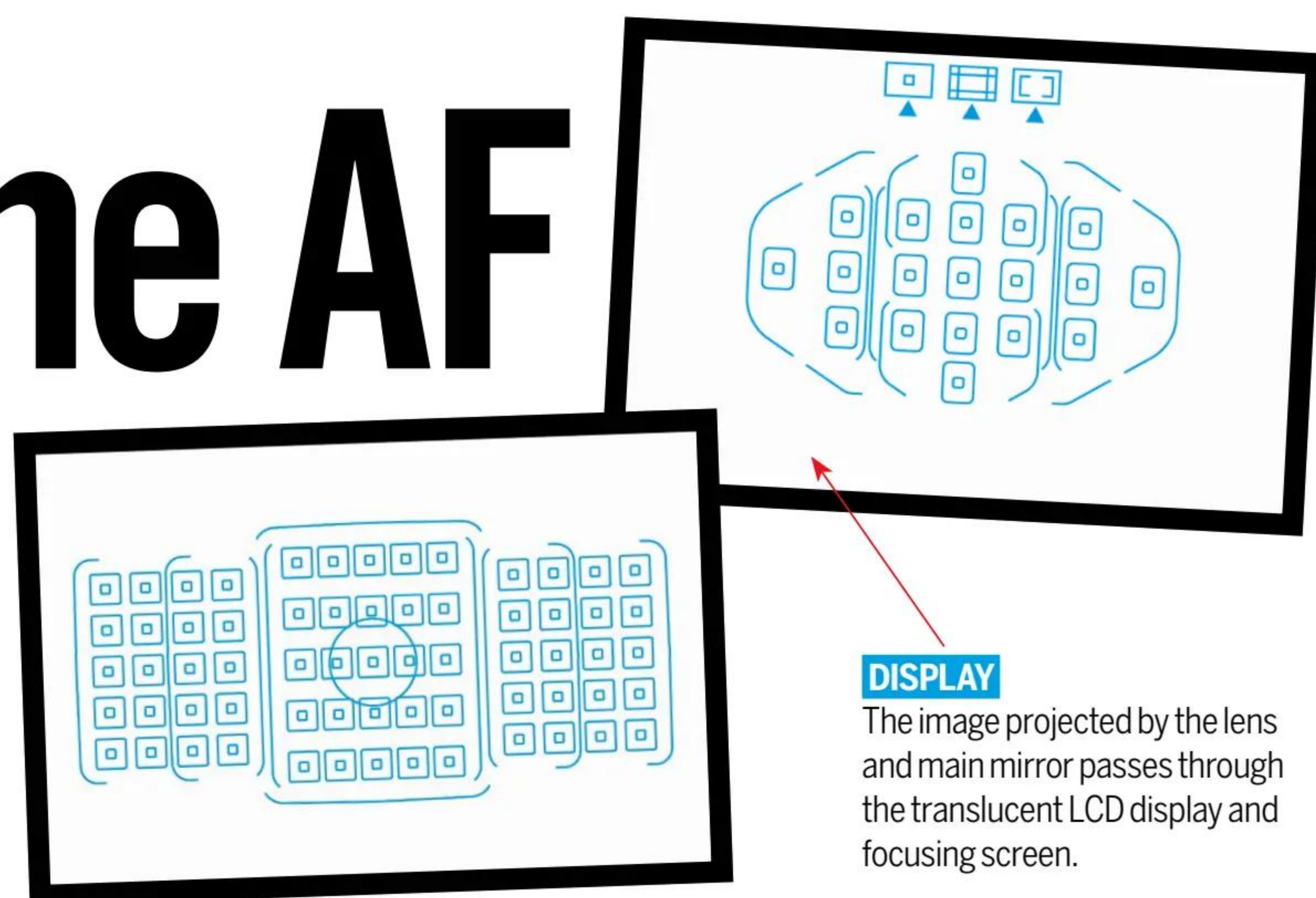
point. It also means that you're less likely to have to adjust the camera position to focus before recomposing a shot. This is beneficial when shooting close-up with a shallow depth of field, where using the focus-and-recompose technique can lead to blurred shots.

You can choose to use just one of your camera's autofocus points or all of them. Light them all up and the camera will automatically choose the focus point(s) that correspond with the area it believes should be in focus. Typically, this is the closest part of a scene or subject, or the area of highest contrast; something you need to bear in mind if all the AF points are active as the camera might not focus where you're expecting it to.

HOW AUTOFOCUS WORKS

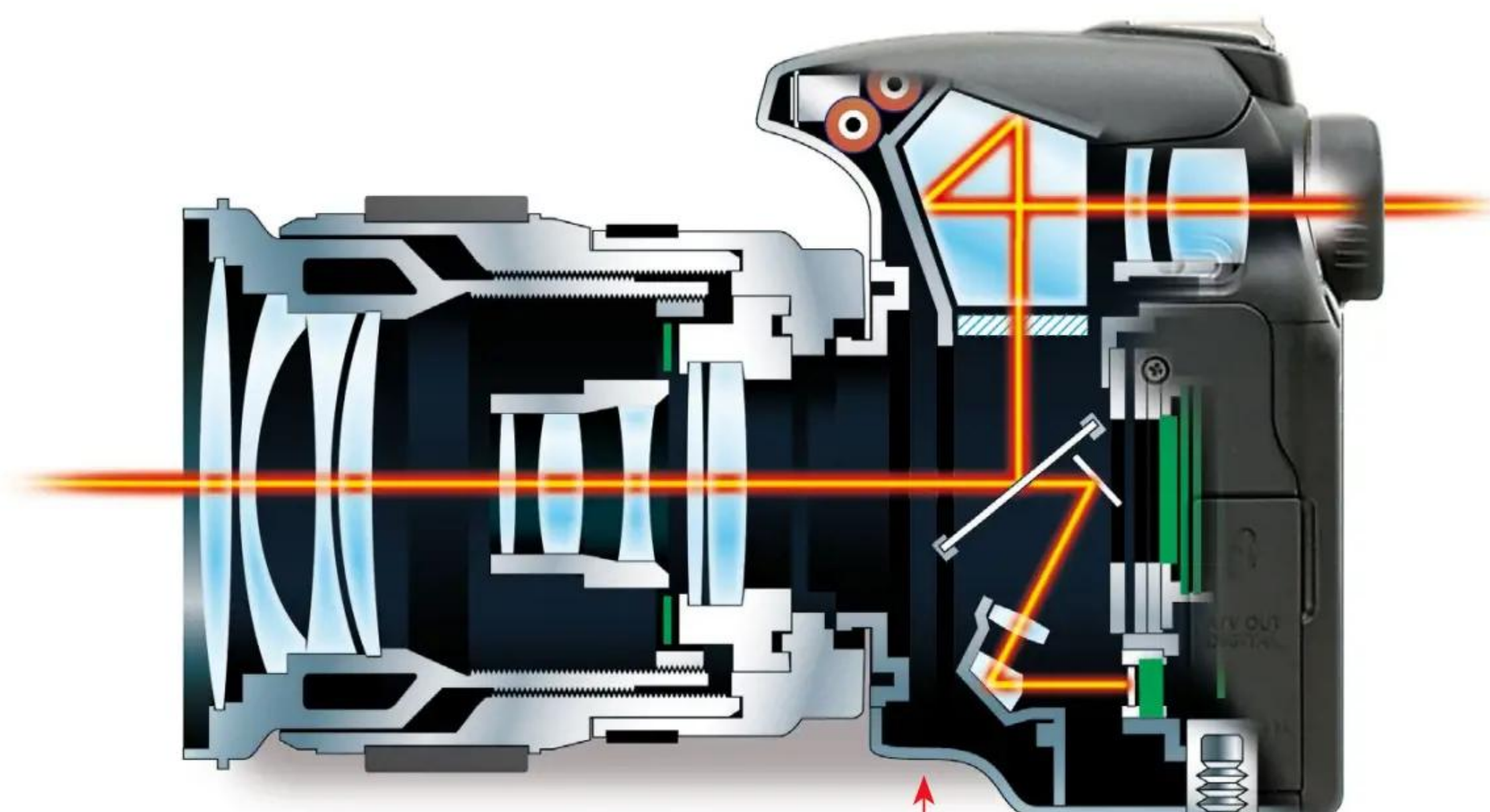
What is phase-detection AF?

NOT ALL OF the light that enters the camera is reflected up into the viewfinder: some of it is reflected down to the AF module that sits below the sensor. This light is separated by a microlens, which produces a pair of offset images on the autofocus sensor. The distance or 'phase difference' between the two images is measured and the camera determines whether the lens needs to be focused closer or further and by how much, in order to make the two images line up. It's a fast system, but relies on mirrors, microlenses and AF sensors being in perfect alignment, so there's some room for error. If you notice that a lens is consistently being focused in front of or behind the target, try using AF microadjustment on a compatible Canon body to compensate.



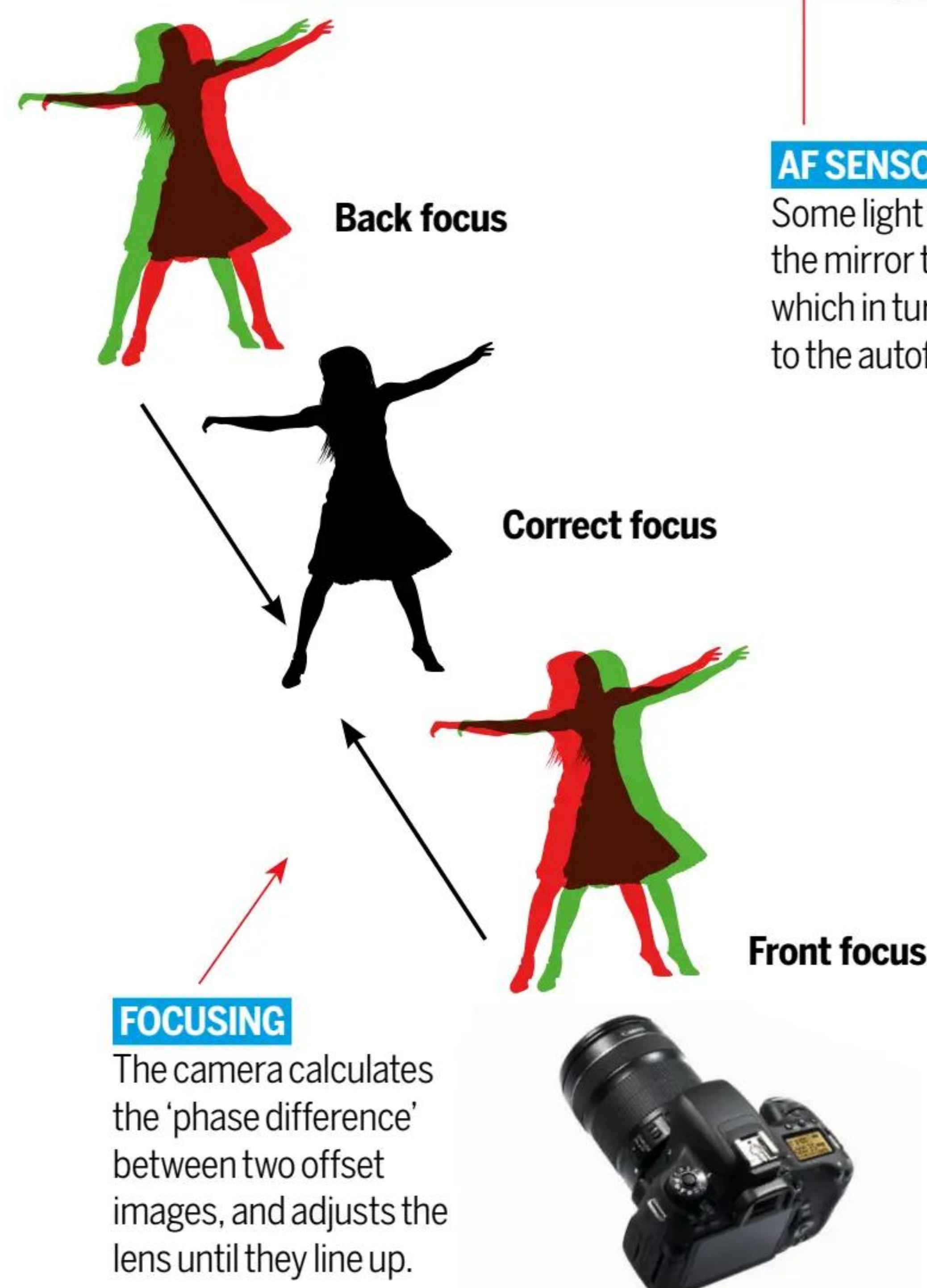
DISPLAY

The image projected by the lens and main mirror passes through the translucent LCD display and focusing screen.



AF SENSOR

Some light passes through the mirror to the sub-mirror, which in turn reflects it down to the autofocus module.



FOCUSING

The camera calculates the 'phase difference' between two offset images, and adjusts the lens until they line up.

THE AF SENSOR MODULE

Understanding the types of AF points

Faster lenses can unlock additional features of the focusing sensor

It's not just the number of AF points that contributes to the speed and accuracy of a camera's autofocus, it's their sensitivity and precision too. Standard AF points have their sensor arranged either vertically or horizontally and are effective at detecting lines of contrast that 'break' the line of the sensor. They can struggle if the lines run parallel with the sensor, and this is one of the reasons that autofocus can fail, with a lens 'hunting' back and forth to find an 'edge' to bite onto. More advanced 'cross-type' AF points combine both horizontal and vertical sensors, while dual cross-type sensors also detect contrast diagonally for greater precision.

All EOS DSLRs have at least one cross-type AF point, while the lion's share of AF points in high-end bodies are all cross-type – although the actual number available varies according to the lens that's attached to the camera. You'll

find a list of lenses and the AF points they unlock in your camera's manual.

Typically, you'll see lens apertures listed alongside cross-type AF points in a camera's specifications; this is the maximum (largest) effective aperture a lens requires to unlock the AF point's additional precision. For example, the 1300D's centre AF point is cross-type at f/5.6, while five of the 5D Mark IV's cross-type AF points become dual cross-type at f/2.8. It doesn't make any difference if you dial in a different aperture on the camera, as this aperture in the lens doesn't change size until a picture is taken. It's the maximum effective aperture of the lens that counts.

For example, if you attach a 70-200mm f/2.8 lens to a 5D Mark IV and you get dual cross-type goodness; add a 2x teleconverter (which reduces the maximum aperture by two stops, to f/5.6) and it reverts to single cross-type.



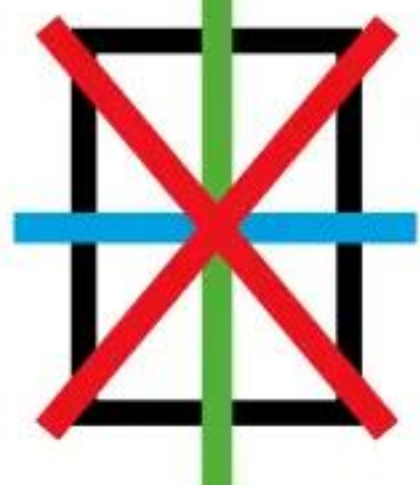
Vertical AF point



Horizontal AF point



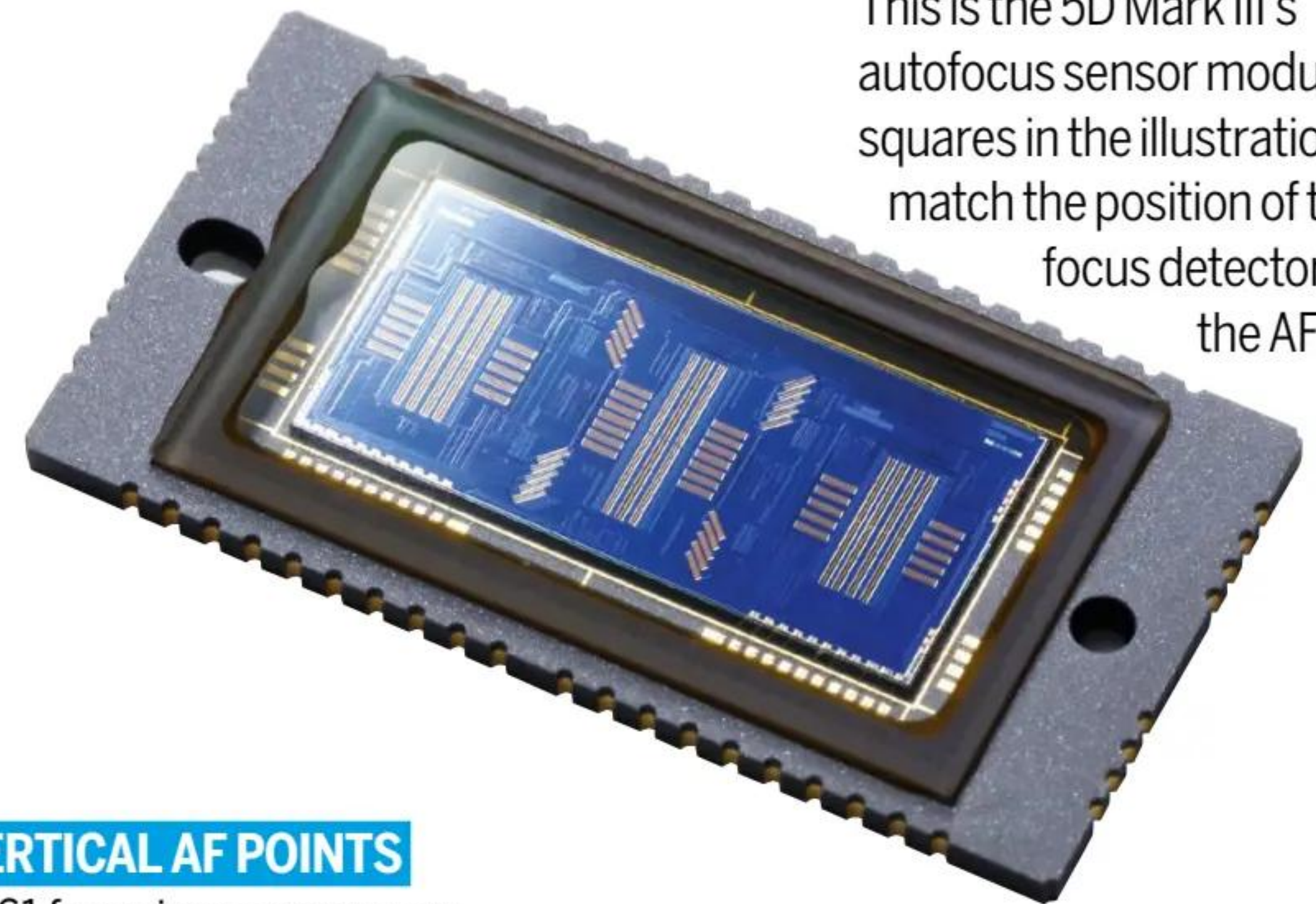
Cross-type AF point



Dual cross-type AF point

AF SENSOR

This is the 5D Mark III's autofocus sensor module. The squares in the illustration below match the position of the focus detectors on the AF sensor.

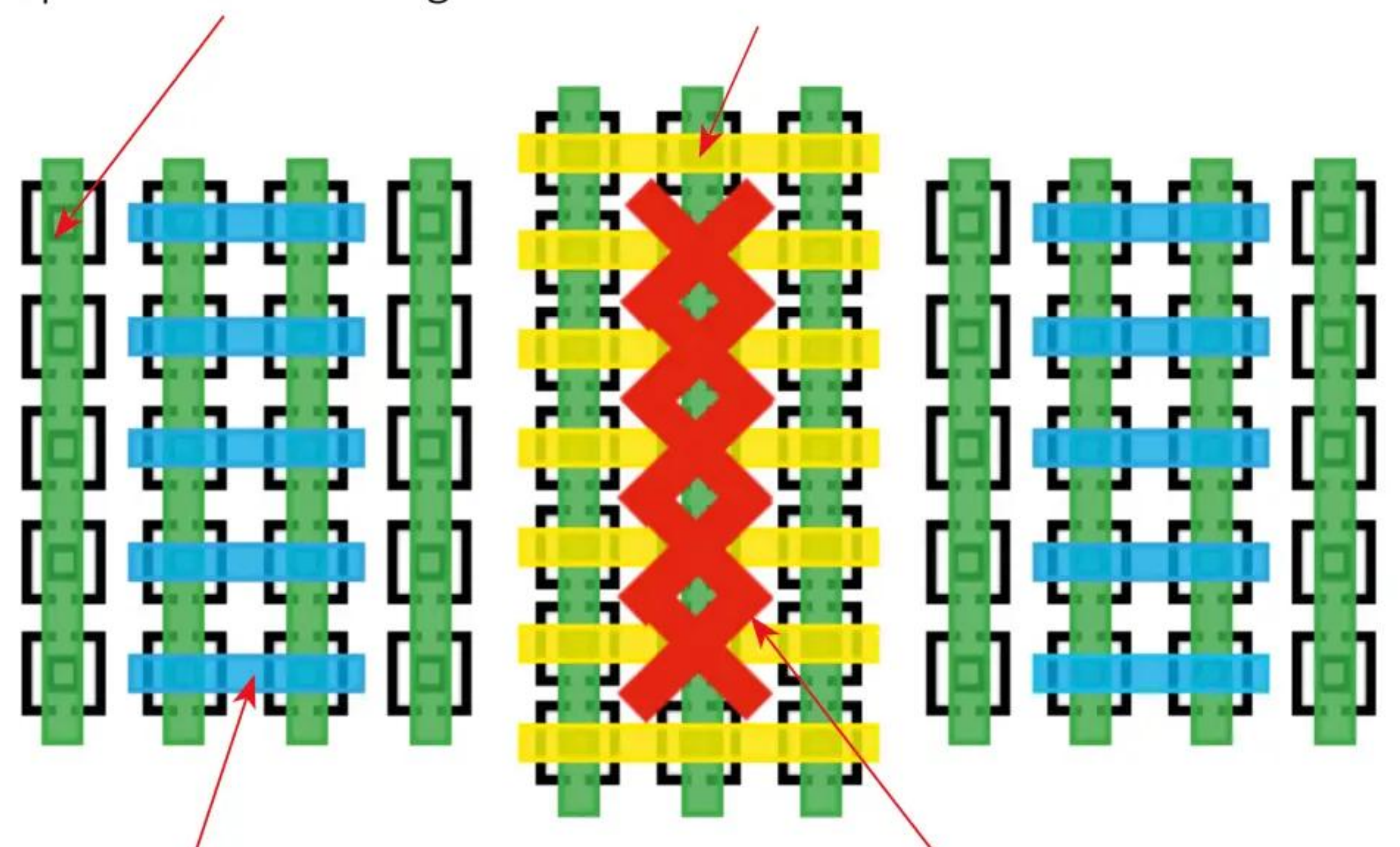


VERTICAL AF POINTS

All 61 focusing sensors can detect horizontal lines with lenses that have maximum apertures of f/5.6 or larger.

MORE SENSITIVE CROSS-TYPE POINTS

The cross-type sensors in yellow can detect vertical lines with slower f/5.6 lenses.



HORIZONTAL POINTS

In addition to detecting horizontal lines, the points marked in blue can detect vertical lines with f/4 lenses – so they offer more precise cross-type focusing.

DUAL CROSS-TYPE

On top of their f/5.6 horizontal and vertical detection, you can unlock a diagonal cross pattern for greater focusing precision with f/2.8 or faster lenses.

Make sense of 'f/8 autofocus'

Teleconverters reduce the amount of light available for the autofocus points

Cameras that support 'f/8 autofocus' are wise investments for sport and wildlife photography. This type of work often requires 500mm and 600mm f/4 supertelephotos fitted with 2x teleconverters in order to get frame-filling shots of distant subjects. But this combination results in an effective maximum aperture of f/8. The same thing

happens when a 1.4x teleconverter is added to a slower telephoto lens, such as Canon's 400mm f/5.6. A maximum aperture of f/8 is too slow for effective autofocus, as there won't be enough light available for the majority of AF points.

But high-end EOS cameras are including focusing sensors that do work at f/8. The 5D Mark IV has 21

f/8 cross-type points, for instance. The feature was even added later to the old 5D Mark III via a firmware update, which was initially released without this ability. In this case, only the centre AF point works at f/8, and while it performs very well with stationary subjects, I've found that it to be a bit shaky at tracking moving subjects.



For autofocus with long lenses and teleconverters you'll need a EOS camera with f/8-sensitive AF points

When to use single AF points or groups

You don't have to use all the AF points – choose the right AF area selection mode for the scene

Advanced EOS DSLRs that have a large number of AF points, such as the 7D Mk II (65 points) and 5D Mk IV (61 points), can make it easier to track small and fast subjects in AI Servo mode, with the AF point array acting like a net across the scene when all the AF points are active.

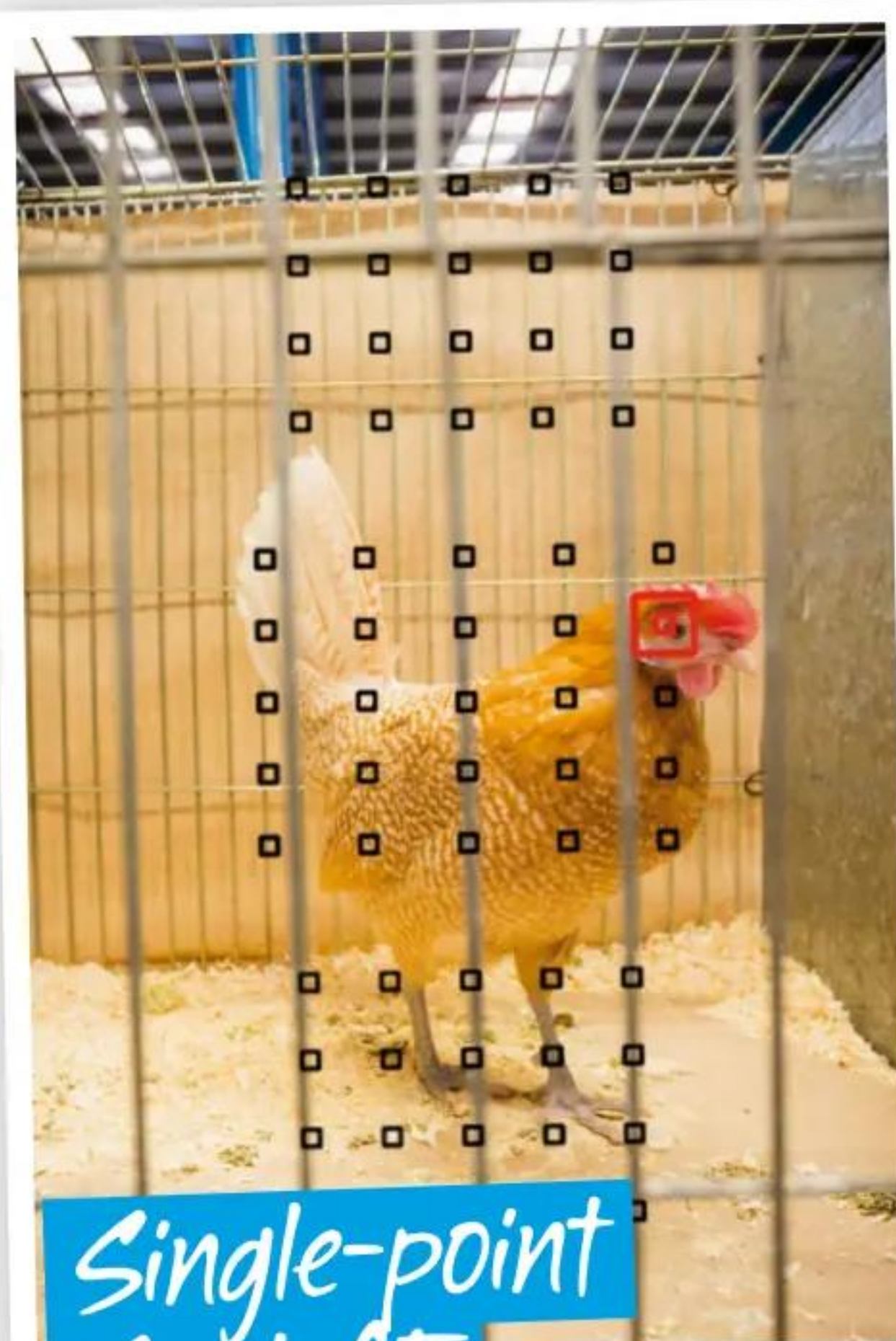
The potential pitfall with such a wide spread is that the AF system might lock onto another part of the scene, especially if it's more detailed than the subject or closer to the camera.

You can, of course, override the automatic AF selection and manually choose a single AF point instead, but trying to

keep one of the small squares trained on a tiny subject moving erratically can be, well, trying. To get around this you can choose from a selection of different-sized AF areas, from an AF Point Expansion mode that uses the selected AF point and those surrounding it to focus, to a Zone AF mode that sees the AF point array split

into predetermined groups. Or you can get even more precise with Spot AF, which measures an even smaller area than Single Point AF to set focus.

Similar to selecting a single AF point, you have to manually choose the main AF point or zone with all these alternative setups – you can find out how to do that below...



Single-point Spot AF

This pinpoint option's useful when the area covered by a normal single AF point would lead to focusing errors – such as locking onto the cage bars here



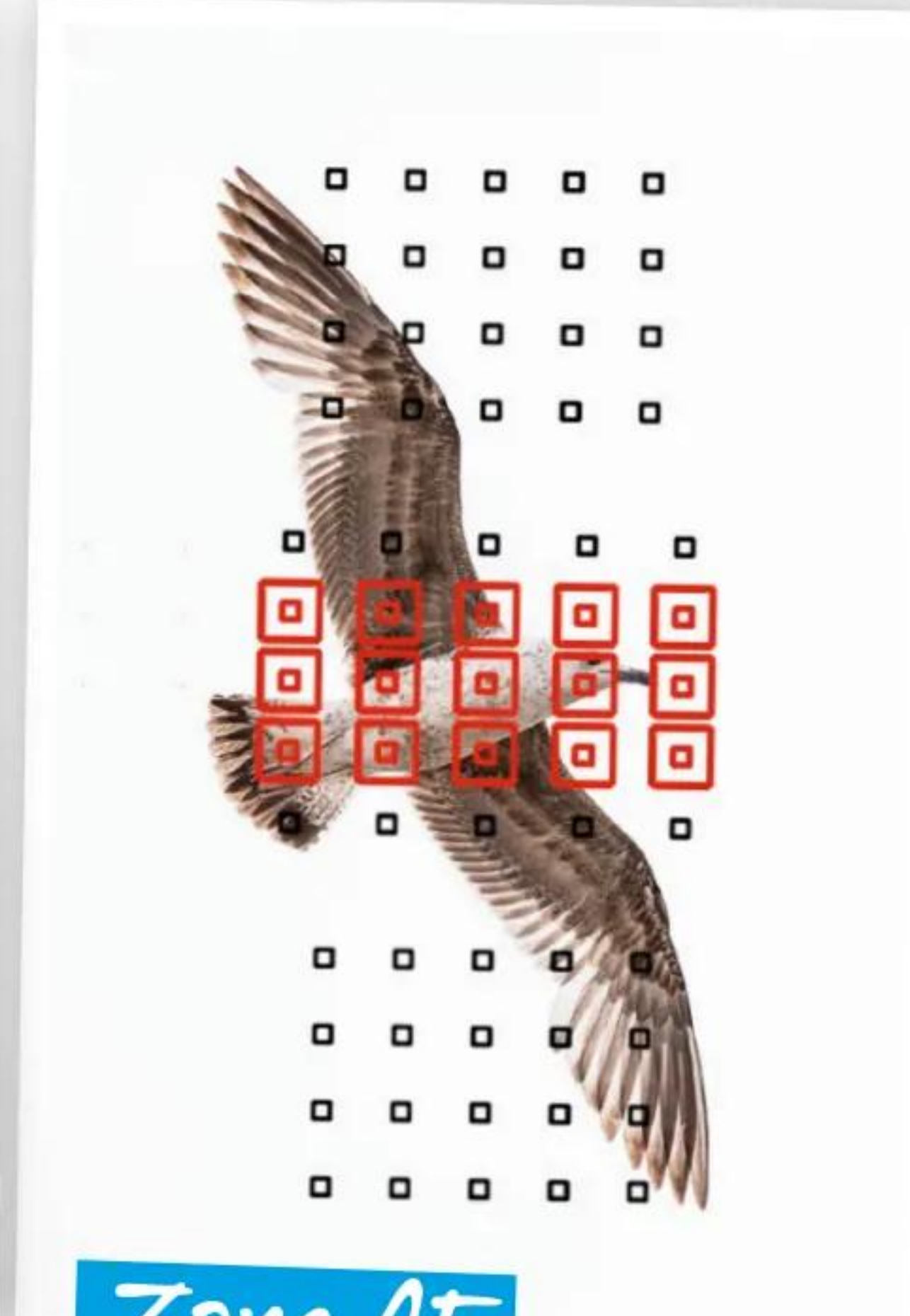
Single-point AF

For portraits, select a single AF point that lines up with the nearest eye, or is close enough so that you can quickly lock focus and recompose



AF Point Expansion

This makes a good choice when photographing active subjects that would be too hard to keep track of with a single AF point



Zone AF

A sound choice for keeping track of subjects that will be moving across relatively 'clean' foregrounds and backgrounds, such as birds in flight

Smarter AF point selection

How to move the AF point or zone around the viewfinder display

To manually select an AF point or zone, you need to be shooting in one of the Creative Zone modes (Av, Tv, M or P). Dab the AF Point Selection button, at the top-right of the back of the camera; the display will illuminate in red and you can cycle through the different AF area selection modes by repeatedly tapping the M-Fn button next to the Main dial, or by using the

dedicated AF Area Select button/lever on the 5D Mark IV/7D Mark II.

With the display active, you can move the selected AF point or Zone. The cross-keys or control dials allow you to move an AF point vertically or horizontally or cycle through the zones, while the Multi-controller joystick on compatible EOS bodies can be customised to give direct

control over the AF point or zone without having to press the AF Point Selection button first. Any AF points that offer just basic horizontal line detection will blink as a warning.

Cameras with large amounts of AF points offer shortcuts to speed up AF point selection. For instance, in the AF menu you can reduce the

number of manually selectable AF points, or customise the amount of AF area selection modes available so that you can cycle through the options quicker.



DUAL PIXEL AF

The Dual in the crown

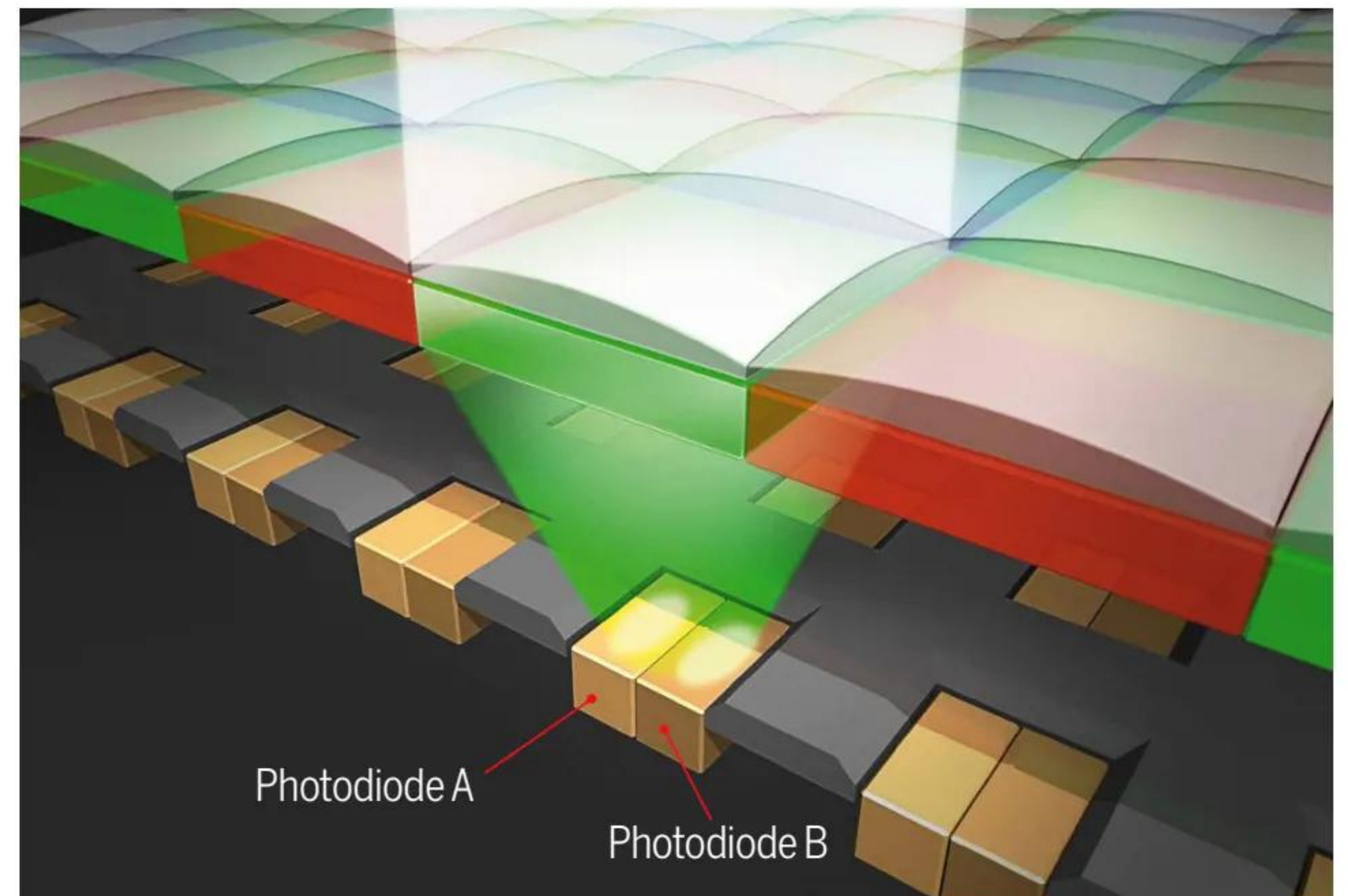
Canon's Dual Pixel AF brings phase-detection autofocus to Live View

Live View autofocus has long been seen as the poor cousin to autofocus using the optical viewfinder. In Live View mode, the mirror inside the camera has to flip out of the way so that the imaging sensor can be continuously exposed to light in order to display an image on the rear screen. Without the mirror in place, no light reaches the camera's phase-detection AF sensor, so the autofocus is achieved by measuring contrast levels on the imaging sensor itself. It's a much slower system than phase-detection AF, but Canon changed everything with the launch of Dual Pixel CMOS AF in the 70D.

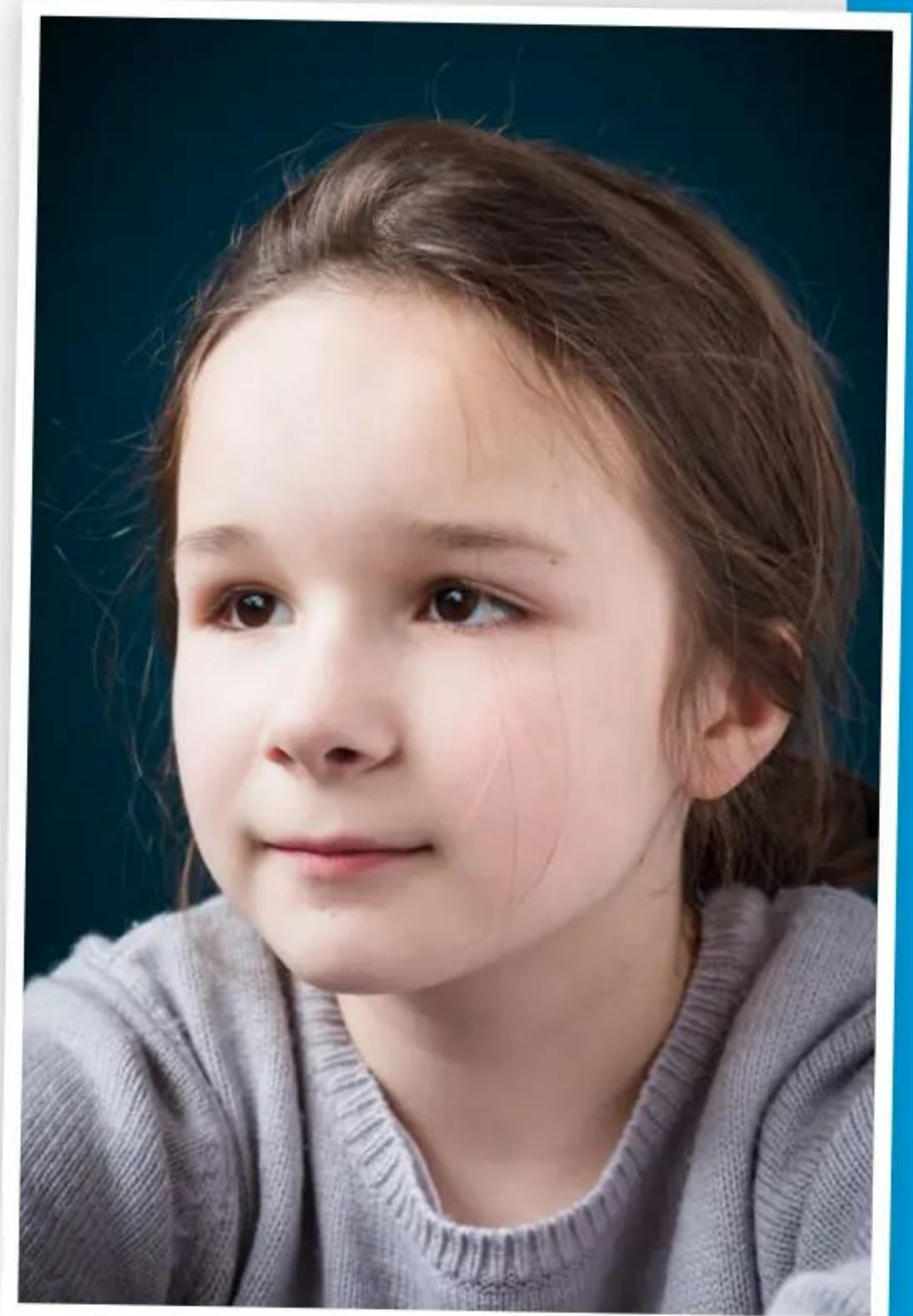
With this system, each pixel on the imaging sensor is split into two photodiodes: A and B. They are read together to

record an image, but separately in order to give fast and continuous autofocus; each pixel essentially becomes a phase-detection AF point.

The 5D Mark IV's Dual Pixel Raw files take it a step further. These files actually contain two images: one is made of the combined A+B image data, and the other consists of the image data from only the A photodiode. Canon's Digital Photo Professional has a Dual Pixel Raw Optimizer that can decode the depth information that the two offset images provide, enabling you to make microadjustments to where the sharpest point is. Don't expect to be able to refocus the shot to any great extent, but rather shift the position of maximum sharpness from an eyelash to the eyeball in a portrait.



Dual Pixel Raw files are twice as big as normal Raw files and can only be taken full advantage of in DPP. You'll also get the most noticeable results with longer focal lengths and wide apertures



School tip Instant focus fix

Try the Orientation Linked AF Point shortcut

BURIED IN THE AF menu or custom function options of some EOS DSLRs, including the 80D and 5D Mark IV, is a setting called Orientation linked AF point. By default, the active AF point stays in the same position whether you're holding the camera horizontally or vertically, but with Orientation Linked AF Point activated you can have the AF point jump to a

preselected position when you rotate the camera. You can even have the AF area change too, such as switching from Zone AF for a horizontal shot to single-point AF for a vertical one. The camera remembers the last setting used for each orientation, so there's no faffing around with menus. It's handy for when you're shooting wildlife or an



event such as a wedding, as you can have the AF point automatically move towards the top of the display, close to where a subject's head or eyes will be, as you turn the camera vertically.

Photographer's Apprentice

Reach the peak 112

Modern family 122

Great Gower seascapes 134





PHOTOGRAPHER'S APPRENTICE



APPRENTICE

NAME:

TIM WARDLE

CAMERA:

CANON EOS 70D

TIM is a contracts manager for a Leicester-based timber frame specialist and has always enjoyed photography as a hobby. His first camera was a Kodak Ektar 400, which he used for holiday snaps and family photos. In the digital age, he moved from a 700D to a 70D as his skills progressed. With a passion for landscapes he needed a helping hand to help him improve his photography skills.

CANON PRO

NAME:

DAVE FIELDHOUSE

CAMERA:

CANON EOS 5D Mk III

AWARD-WINNING landscape photographer Dave is a regular contributor to camera and outdoor pursuit magazines. As well as teaching outdoor techniques to amateur photographers, he has a vast knowledge of photo spots in the Peak District, making him just the man to lend a helping hand to this issue's Apprentice. For more of Dave's work, see www.davefieldhousephotography.com

REACH THE PEAK

This month's Apprentice heads for the hills in the Peak District to shoot captivating landscapes with Canon pro Dave Fieldhouse

PHOTOGRAPHER'S APPRENTICE

TECHNIQUE ASSESSMENT

Canon pro Dave checked over Tim's camera to ensure it was set up for peak performance



M FOR MANUAL EXPOSURE

"I WAS pleased to see that Tim was already comfortable shooting in Manual mode," says Dave. "Being able to independently control the shutter speed and aperture gives you far more control over your exposures, which is crucial in constantly changing lighting conditions. I got Tim to set a narrow aperture of between f/11 and f/16 for a good depth of field for front-to-back sharpness."

ENABLE LIVE VIEW MODE

"I GOT Tim to enable Live View mode, which slows down the whole process to enable you to really think about composition," Dave explains. "Switch your lens to manual focus (MF) and zoom into your focal point, which should be a third of the way into the scene. Then gently twist the focus ring to bring your subject into sharp focus. Another benefit is that the mirror is locked up, so there's no chance of camera shake from the movement of the mirror during the exposure."



CHECK THE HISTOGRAM

"I ENCOURAGED Tim to get into the habit of checking his histogram after each exposure to ensure there was an equal spread of pixels," reveals Dave. "If pixels are stacked up and cut off on the right-hand side, the highlights are clipped. An added benefit of shooting in Live View means you can see the histogram *before* you take the shot, so can adjust the shutter speed accordingly for a balanced exposure."



HOT SHOT #1

Lens	Canon EF 24-70mm f/2.8L II USM
Exposure	1/30 sec, f/11, ISO100



**EXPERT INSIGHT****WATCH OUT FOR SHADOWS**

THE late afternoon winter sun sits low in the sky, which can cause havoc with shadows when shooting with the sun behind you. Not only do you have to watch out for areas of high contrast from parts of the landscape already in shade, but also be aware of your own shadow creeping into the frame. Here, Tim has captured a potentially good shot of a lone tree with distant rocks, but most of the foreground area has been plunged into distracting shadow.

**TOP GEAR #1**

Canon EOS 5D Mark III

AFTER starting out with a Canon EOS 7D, Dave upgraded to a 5D Mark III to take advantage of its full-frame capabilities. "I love the colours that the camera re-creates, and the latest processing software enables a lot of recovery of detail from the shadows. Together with my wide-angle Canon EF 16-35mm f/2.8L IS II USM, I can capture sweeping scenes and achieve great depth of field for front-to-back sharpness," reveals Dave.

TIM'S COMMENT

// We were en route to Roach Barn for our sunset shoot when we passed this stunning scene, so Dave pulled over into a lay-by so we could get out and capture it. I love the depth in this photo, it has so many layers to explore; from the stone walls in the foreground, through the lone windswept tree and sheep lit up by the warm evening sun, to the fields, Tittesworth reservoir and the distant hills beyond. I composed the shot to ensure I captured the entire reservoir and Dave suggested a 16:9 crop in post-production to make use of the rule of thirds. **//**

PRO TIP**UP THE ISO**

"IT was extremely windy up on Ramshaw Rocks, which was great for capturing a bit of movement in the grass and trees. But for other shots, where we wanted to freeze all movement, our shutter speed needed to be relatively quick. Rather than opening up the aperture, which I would rather keep at a narrow value, it's better to increase the ISO to achieve a faster shutter speed."



HOT SHOT #2

TIM'S COMMENT



It's easy to get drawn into the scene in front of you, so when Dave suggested it would be a good idea to have a look around to what else might be of interest, I was surprised to see this view right behind me. I composed with the path we had walked up earlier at the bottom of the frame and sweeping round to the right to create a leading line to guide the eye into the scene.

Lens	Canon EF 24-70mm f/2.8L II USM
Exposure	1/80 sec, f/10, ISO100

TOP GEAR #2

Assortment of filters

"I DON'T go anywhere without my set of Lee filters as I'd rather capture everything in-camera. I carry soft and hard ND grads to darken bright skies and reveal detail, plus a variety of 'straight' ND filters, including a Big Stopper, to slow exposures and capture movement in a scene."



PRO TIP

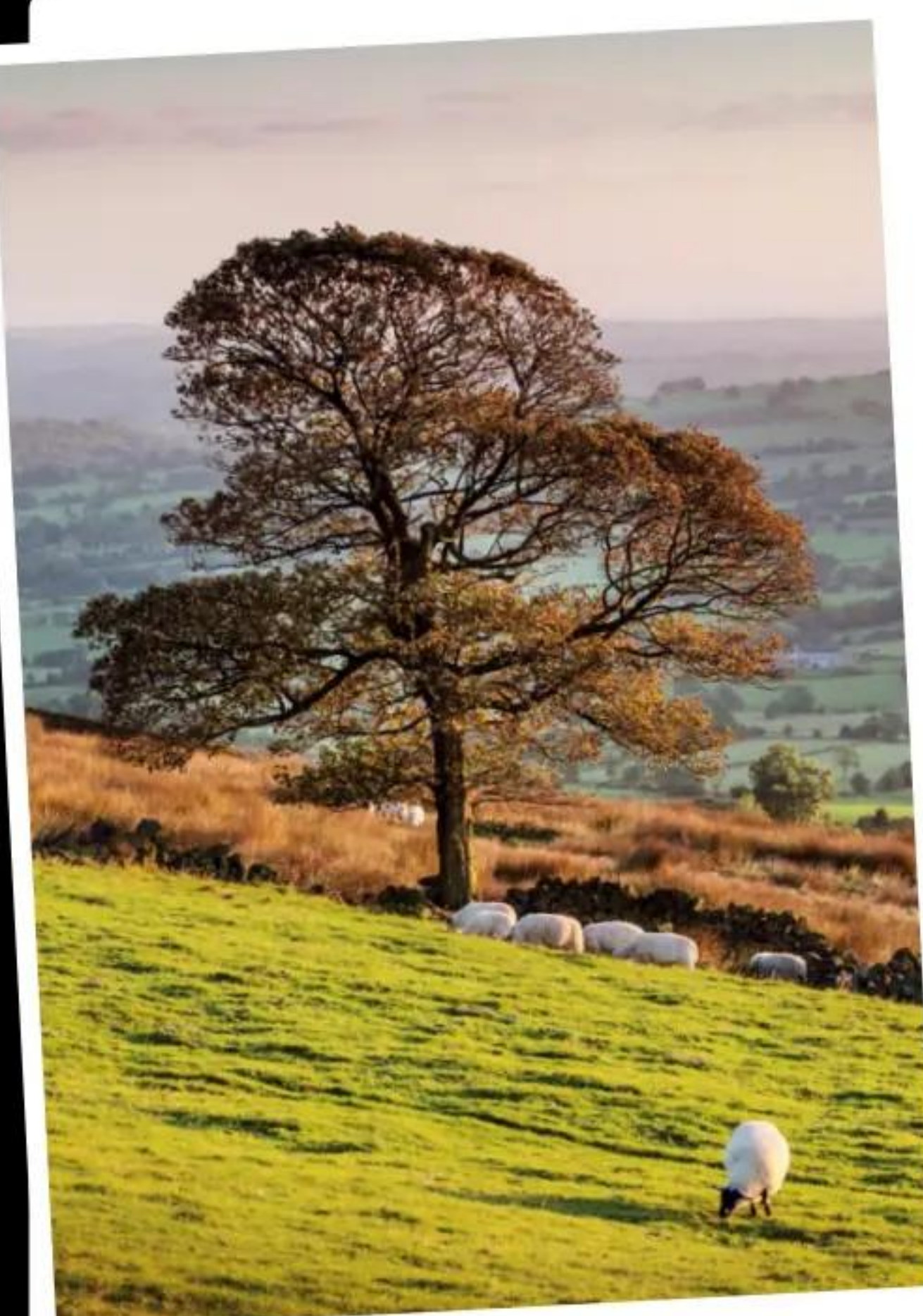
RAW QUALITY

"I WAS pleased to hear that Tim shot in Raw. It's vital that your camera records as much information as possible to get the most out of the file. Raw processing software, such as Lightroom, is excellent at recovering lost detail in the shadows and rescuing clipped highlights. A quick demo of how to process a Raw file back at the hotel we were staying at had Tim hooked on Lightroom instantly."

EXPERT INSIGHT

INCLUDE WILDLIFE

"WHEN we arrived on location I knew the sunset wasn't going to be as forecast so I discussed other options with Tim. That's when we noticed the sheep grazing near this lone tree, making an excellent photo op, providing we didn't scare them off! Including wildlife in your scene adds another element of interest and helps to tell a story. One of my favourite Peak District shots has a hare in it, which earned me category winner in Landscape Photographer of the Year competition in 2014."



**HOT
SHOT
#3****TIM'S COMMENT**

With clear skies at sunset we had to fill the frame with something other than an empty sky, so Dave pointed out this viewpoint and told me to compose with the tree and barn in the distance. I positioned the stone wall winding down the hillside in the lower third to lead the eye into the frame. With the sun partially blocked by the branches of the tree and a narrow aperture of f/16, I was able to achieve a starburst effect of the light shining through, adding an extra dimension to the scene.

Lens	Canon EF-S 10-22mm f/3.5-4.5 USM
Exposure	1/15 sec, f/16, ISO100

PHOTOGRAPHER'S APPRENTICE



EXPERT INSIGHT

EXPLORE THE AREA

“WE spent some time at Roach End Barn and I asked Tim to circumnavigate the area to see what compositions were on offer. He managed to capture a handful of shots and it's interesting to see how much variety you can get from one subject in one location. This shot was taken from the other side of the barn to Hot Shot #4. This time we gave it a monochrome and split-tone treatment for a scene full of texture and contrast.”

PRO TIP

LOSE THE LEGS

“AT each location I got Tim to walk around with his camera and look through the viewfinder to establish a rough composition before setting up his tripod. It's much quicker and easier to see how things are looking from different angles, up high or down low,” advises Dave.

PRO TIP

HANDY APPS



DAVE uses The Photographer's Ephemeris to see where and when light will fall at any given time in any location over the world. He uses the BBC Weather app to check the forecast; if there's not much wind and humidity levels are above 90% then there's a good chance of capturing mist at sunrise for added atmosphere.



HOT SHOT #4

Lens	Canon EF-S 10-22mm f/3.5-4.5 USM
Exposure	1/125 sec, f/8, ISO100

EXPERT INSIGHT

GET A SENSE OF PERSPECTIVE



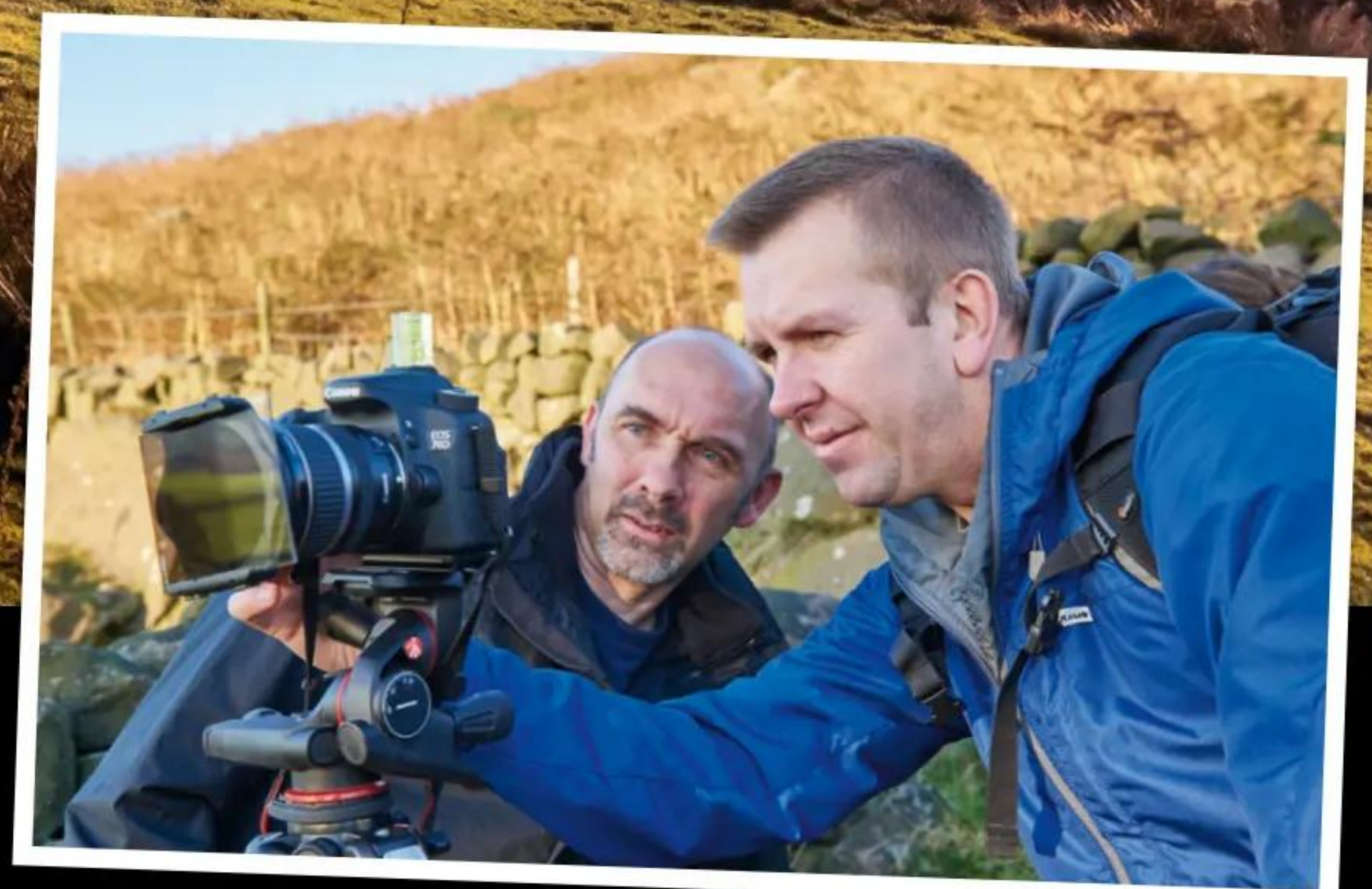
also enables me to crop out the sky if there's no interesting cloud detail or colour to capture,” he explains.

WHILE wide-angle lenses are the logical choice for capturing as much of the scene as possible, Dave also likes to use a telephoto lens to zoom in on distant details or to isolate parts of a scene. “It enables me to concentrate on the most interesting elements in the scene, and

TIM'S COMMENT



Despite the lack of texture in the sky, there was plenty of lovely golden light hitting Roach End Barn and the surrounding trees. I wanted to include all three trees, some foreground detail, and the hills and reservoir in the distance. Using my wide-angle 10-22mm lens on my crop-sensor camera, I was able to fit everything in this cracking shot. I love how the landscape in the distance has taken on a golden glow from the setting sun.



TOP GEAR #3

Essential extras

“I ALWAYS carry gloves, even if it’s not that cold, as strong winds soon cause numb fingers, which isn’t helpful when controlling a camera. A head torch is a must for sunrise and sunset shoots, while a packet of biscuits will help to keep hunger at bay while you’re waiting for the perfect moment to capture your scene.”



PRO TIP

FLAG THE FLARE

“LENS flare can be really distracting yet it’s easy to stop it from ruining your landscape scenes,” Dave explains. “I simply held a filter bag to one side of the lens to shade it from the direct sunlight; if you don’t have anything suitable, even your hand will do the job.”



PHOTOGRAPHER'S APPRENTICE

SHOT OF THE DAY!



TIM'S COMMENT



// I had a great couple of days in the Peak District with Dave and the *PhotoPlus* team; it really boosted my confidence when it came to shooting landscapes, especially during the golden hours. This shot was taken at dawn; we were on location half an hour before to give us plenty of time to get set up. While it didn't turn out to be the most spectacular sunrise, I love the colours and texture in the sky. I took on board many of Dave's tips, including using the rule of thirds to compose the scene, with the landscape in the lower two-thirds and sky at the top, and I made use of the pathway as a leading line to draw the eye into the frame. It was wonderful to be able to capture such an iconic Peak District image. **//**

DAVE'S VERDICT



// Tim was a fantastic Apprentice – he was eager to learn and already had a good eye for composition. This shot was taken at a popular photographic location and, had the conditions been perfect, we would have been fighting for a spot! On one hand we were lucky to have the place to ourselves but on the other, conditions could have been better. Tim did well to capture a good exposure with plenty of detail that we could pull out in post-production. By setting his camera up high he has included the gate and fence in the lower third of the scene, but without making them too dominant, and the extra height has enabled him to capture the entire pathway on the other side trailing off into the distance to lead the eye in. **//**



Lens	Canon EF-S 10-22mm f/3.5-4.5 USM
Exposure	1/5 sec, f/16, ISO100

PHOTOGRAPHER'S APPRENTICE

MODERN FAMILY

Award-winning family photographer Nina Mace helps our Apprentice improve his family portrait techniques



A woman with reddish-brown hair, wearing a blue trench coat and sunglasses on her head, is smiling and holding a Canon EOS 5D MK III camera. Next to her, a man with grey hair, wearing a light blue shirt and dark trousers, is also smiling and holding a Canon EOS 70D camera. They are standing in a lush green garden with trees and bushes in the background. A yellow arrow points from the 'APPRENTICE' section to the man's camera, and another yellow arrow points from the 'CANON PRO' section to the woman's camera.

CANON PRO

NAME:**NINA MACE****CAMERA:****CANON EOS 5D MK III**

NINA, 40, is a professional family portrait photographer based in Hemel Hempstead. She won the 2014 Children, Family & Lifestyle Photographer of the Year award with the Guild of Professional Photographers, and runs Masterclasses for the Society of Wedding and Portrait Photographers (SWPP). She offers 1-2-1 mentoring and photography workshops, details and her stunning portfolio are at: www.ninamacephotography.com

APPRENTICE

NAME:**PAUL LAPHAM****CAMERA:****CANON EOS 70D**

PAUL, 60, is a law lecturer at Kingston College, and lives in Richmond. Three years ago he began taking photography evening classes once a week. He started out with a Canon PowerShot compact but wanted more from his camera, so he upgraded to a Canon EOS 70D and hasn't looked back. Paul's into all types of photography, but wanted our help to take better family portraits.

PHOTOGRAPHER'S APPRENTICE

TECHNIQUE ASSESSMENT

Nina helped *PhotoPlus* Apprentice Paul set up his camera ready to capture family portraits



AV TO MANUAL MODE

“**PAUL** was used to shooting in Av mode, only going to Manual mode when using lights,” says Nina, “However, I was keen for him to use Manual so he could take charge of his aperture, shutter speed and ISO for more control over his results. I asked him to set a minimum shutter speed of 1/500 sec to freeze fidgety kids and avoid motion blur in limbs, and a wide aperture, such as f/4, to blur the backgrounds, then adjust ISO to expose for skin tones; on our overcast day in the shade, this was 400 to 640.”



WARMER WHITES

“**WHEN** it comes to portraits, photographers need to find a white balance to suit their image style. For me, I set my white balance on my Canon 5D Mark III to 6400 K – warmer skin tones are my preference, whether indoors or outdoors. This also means the white balance stays consistent so images look good together for client's galleries. I sometimes even go up to 8000 K in the golden hour! For Paul's 70D, however, we found that 5500 K was much better for accurate colours that still had warmth, so see what works best for your camera,” advises Nina.

PAUL'S COMMENT



After trying a few shots of the family's two boys together, we got each one to separately lean over the back of a park bench that was perfectly placed for some shaded light, with a large expanse of sky to look into to light up their faces and eyes. Nina helped me to compose the shot so the blurred background behind is darker to contrast with the boy's skin tones and light blue clothing she'd asked his parents to dress him in.

HOT SHOT #1

Lens	Canon EF 70-200mm f/4L IS USM
Exposure	1/640 sec, f/4, ISO400

EXPERT INSIGHT

WHAT IS THE BEST NATURAL LIGHT?

NINA likes to keep things simple on location shoots, and she never uses a reflector, let alone flashguns. “Avoid direct sunlight, otherwise you'll get harsh shadows and squinty faces, also avoid top lighting – when the sun is directly overhead – as it is during the day in summer,” says Nina. “The best spots are under trees in shade, but with diffused – not dappled – light. You don't want too much shadow though; you need to find the sweet spot under overhanging foliage with a clear section of sky lighting the face. You want soft light on faces and so the eyes are bright.”





PRO TIP

RIDE THE SHUTTER

“WHEN shooting, I tend to leave the aperture wide open at f/2.8 and ISO on 100-800, depending on light levels, then ride my shutter speed if the sun is dipping in and out,” says Nina. “This can be up to four stops difference, starting at 1/500 sec and up to 1/4000 sec. I constantly check images on the LCD, adjusting the shutter speed if I need to.”



TOP GEAR #1

Luxury lenses

NINA uses a range of fast telephoto lenses to capture her dreamy, atmospheric portraits. “I carry three main Canon EF lenses: the 200mm f/2.8L and 135mm f/2L primes, and 70-200mm f/2.8L zoom – which I keep almost permanently on 200mm for lovely background separation for my subjects to stand out clearly,” she says.



PHOTOGRAPHER'S APPRENTICE

TOP GEAR #2

Full-frame DSLRs

“THE EOS 5D Mark III is fantastic for portraiture,” says Nina: “It’s full-frame, which helps with beautiful background blur when I use my telephotos lenses wide open; the image quality is great, with lovely natural colours; and I have no trouble with noise, even when shooting at high ISO settings. I carry two bodies in case my main camera fails me – it hasn’t yet!”



PRO TIP

AUTOFOCUS MODE

“I PREFER to use the AI Servo AF mode as my family subjects are always moving around, so use I this focus tracking method for a better hit rate. I set back-button focus, then constantly hold down the (AF-On) button so my camera is continuously adjusting the focus for sharp shots,” says Nina.

HOT SHOT #2

PAUL'S COMMENT



The little girl was quite shy so we got her to pick flowers and she was much happier. The shade under the tree has created a lovely diffused light. The flowers add some lovely colour to both the foreground and background, as well as adding depth, without distracting the eye from our pretty little subject. I shot this at 150mm, so knelt down from afar to include some of the surroundings, and, at f/4, it's blurred the background artistically.

HOT SHOT #3

PAUL'S COMMENT



With the kids happy, we brought in mum and dad for a group shot. We got them to squeeze in nice and close, and Nina engaged with them brilliantly so they have great expressions. The only thing I'd want to improve on is the position of the little boy with his body covered by a flower in the foreground, but I still think it's a great shot.



Lens	Canon EF 135mm f/2L USM
Exposure	1/500 sec, f/2.8, ISO400

TOP TEN PORTRAIT TIPS

- 1

Fast telephoto lens
Use a combination of a wide aperture and long lens to blur the background – eg f/2.8 at 200mm.
- 2

Paparazzi mode!
Use High-speed Continuous mode to increase your chances of capturing great portraits.
- 3

Overcast is okay
On an overcast day, the sky works like a giant softbox – you still need to avoid top light, though, so head under tree canopies.
- 4

Background checks
Get to know the local countryside, and where the best photo ops are – under overhanging trees, with darker, contrasting backgrounds.
- 5

Engaging with subjects
Chat to, encourage, and make subjects laugh so they're relaxed and having fun. Offer direction on body and hand positions, too.
- 6

Read the seasons
Each season, from spring to late summer, offers different colourful blossom backgrounds; from bluebells and wild garlic to cowslips, rapeseed and poppies.
- 7

AI Servo AF
Subjects constantly move so use this focus-tracking method for a better hit rate of sharp shots.
- 8

Reduce AF points
Nina sets up her 5D Mark III so only the cross-type AF points are active; so she can access them quicker than using all 61 points.
- 9

Green grass of home
Sunlight reflecting off green grass can make people look like the Incredible Hulk! Move people to a different spot so their skin tones don't have a green cast.
- 10

Removing colour casts
But if you do get colour casts, use Photoshop to fix them selectively with layers and masks, so people's skin looks natural while the surroundings remain green.



Lens	Canon EF 70-200mm f/4L IS USM
Exposure	1/640 sec, f/4, ISO640

EXPERT INSIGHT PAPARAZZI MODE!

MOST Canon cameras have two burst modes; Continuous and High-speed Continuous, which, on Paul's enthusiast-level EOS 70D DSLR, offers seven frames per second – ideal for family portraits. “I encouraged Paul to use the high-speed burst mode – or paparazzi mode as I call it! By firing off multiple shots, it gives you more choice for successful shots, and means that, even if somebody blinks or pulls a face, you'll likely have a few winners in each set up,” smiles Nina.



PHOTOGRAPHER'S APPRENTICE

PAUL'S COMMENT



For our next set of family photos, we moved into the main part of the park, where we utilised these lovely long paths lined with huge horse-chestnut trees. With the three children huddled together on the middle of the path, I composed so the path disappears behind them. The tree created a nicely shaded top light, with sunlight reflecting off the path just in front of them. Shooting at 135mm at f/4 has blurred the background nicely, but not so much that it's completely unrecognisable.



Nina entertains the kids to obtain good expressions for better portrait shots

HOT SHOT #4

Lens	Canon EF 135mm f/2L USM
Exposure	1/500 sec, f/4, ISO400

TOP GEAR #3

Camera bag

“I GOT this Lowepro Off-Road LP 106 camera bag for £10 from a charity shop. I prefer this shape of bag, and it’s easy to access all my kit – with two big lenses in each end, and a spare body in the middle. It’s not too huge, and I can wear it as a giant bumbag if I want to commit a massive fashion faux pas!” laughs Nina.



MAKE THE MOST OF GROUP SHOTS

“WHEN photographing the family as a group, get them to squeeze tightly together for a better pose and shape that’s not so spread out. Get the family to mess about – dad tickling the kids works well – rather than posed,” says Nina. “When in a pile together, it’s a good opportunity to grab some close-up headshots of each subject, especially if the kids look more comfortable sat with the family so you get better facial expressions. These can look nice in black-and-white, as the faces stand out against everybody else’s clothes.”



PRO TIP

AF POINT DISPLAY



NINA set up Paul’s camera so he was using Single-point AF mode, and got him to compose with his AF point over the subject’s eyes. “This ensures sharper shots than if you focus with the central AF point then recompose,

which at f/2.8 can throw your focusing off after the slight movement as you reposition the camera. I also switched on AF Point Display, so when you’re reviewing images on your LCD, you can check to see what you’ve focused on.”

EXPERT INSIGHT
BACK-BUTTON
FOCUS

“I USE the back-button focusing method as I find it’s faster and more accurate as I’m constantly refocusing as families move around and kids fidget,” says Nina. “In the Custom Function menu on Paul’s 70D, we set up his camera so the AF-On button is exclusively used to focus – you need to disengage focusing from half-pressing the shutter button, so that it’s only used for metering. Once you get used to back-button focusing, I guarantee that you’ll never go back!”



TOP GEAR #4

Memory cards



“I KEEP my memory cards in this trusty blue box. As my 5D Mark III cameras have dual slots, I use the CF card to record Raws, and the SD card to record JPEGs as backup. I rarely look at the JPEGs, but they’re available should I never need them. And if a card ever lets me down I’ll bin it straight way,” advises Nina.

PHOTOGRAPHER'S APPRENTICE

NINA'S BEAUTIFUL PORTRAITS

Brilliant professional family photographer Nina Mace shares three of her top photos



BLUEBELLS

“**ONE** of the biggest challenges of shooting in bluebells is the light, so this was shot as late as possible. I allowed some movement into the dress by slowing down the shutter speed.”



BLOSSOM

“**TAKEN** on my 5D Mark III with the EF 135mm f/2L, I was experimenting with how much bokeh I could create at f/2 by moving my subject away from the pink blossom tree. To get height I had her stand on a park bench.”



SPRING

“**I LOVE** spring flowers but the light was very bright on this session, so I placed my subject into the tree line to ensure that she wasn't squinting. I shot on the EF 135mm f/2L at f/2.5.”



HOT SHOT #5

Lens	Canon EF 70-200mm f/2.8L IS USM
Exposure	1/500 sec, f/2.8, ISO400

PAUL'S COMMENT



“ This shot was one Nina had been waiting to get all day – with our subject backlit by the sun that's now lower in the sky, while her face is in diffused top light. It's so simple, yet so effective, as the rim light around long hair makes her really stand out from the contrasting background. It was shot on Nina's 70-200mm lens at the long end and wide open at f/2.8. Nina suggested a black-and-white conversion; she explained that by removing any colour the eye is drawn straight to the girl's face and happy expression. ”

HOT SHOT #6



Lens	Canon EF 135mm f/2L USM
Exposure	1/320 sec, f/2.8, ISO400

PAUL'S COMMENT



Nina found a great spot where a pool of light was falling in amongst some birch trees. Shooting at f/2.8 here has blurred the trees nicely. By getting dad to lift up his son, both of their faces are on the same level so I could get in closer for a more pleasing composition. Nina was great at having fun with them, and her encouragement has resulted in the relaxed poses.

EXPERT INSIGHT

COLOUR WHEEL & CLOTHING CHOICES

AHEAD of our shoot, Nina supplied the families with a Pinterest board for inspiration on what to wear (<https://uk.pinterest.com/ninamace/what-to-wear-spring-shoots>).

She explained to Paul that, ideally, her family would be dressed using complementary colours. “Analogous colour schemes use colours that are next to each other on the colour wheel. They usually match well, are often found in nature, and are harmonious and pleasing to the eye,” she explained, “Ideally, I choose one colour to dominate, a second that supports, and a third colour is then added (along with black, white or grey) as an accent. The dominant colour is that of the backgrounds we intended to use outdoors, so at this time of year it’s green, which means that blues and yellows work especially well, alongside neutrals like greys and whites.”



Dress your subjects in shades that sit next to the dominant background colour on a colour wheel



PRO TIP

POSING AND EXPRESSIONS

PEOPLE often worry if their subjects aren’t looking directly towards them, however you can sometimes capture more evocative shots by doing the opposite, as Nina explains: “Here, you can see that you don’t always need people to be looking down your lens – it works well when they’re looking at each other instead, as if it’s a shared moment, caught on camera.”



PHOTOGRAPHER'S APPRENTICE

PAUL'S COMMENT



// The sun was much lower in the sky by now, and Nina explained this meant it was softer and more flattering for portraits. We still had our family under the shade of trees, and we sat them on a blanket in front of a patch of yellow buttercups. The long focal length and wide aperture has blurred these nicely, as well as the dark, contrasting green background behind. As Nina gave them direction and got them to smile in unison, I captured this winner! **//**

NINA'S VERDICT



// Paul had a good understanding of his Canon camera and just need a little help with finding the best spots for the best light, and building up a rapport with people to get good portraits. He's put everything he's learned together here for a deserved Shot of the Day. Shooting at f/2.8 for group shots like this is fine if, as we've done here, the family are all positioned together on same focal plane. The flowers in the foreground add some colour, and a hint of birch in the background adds to the scene. Getting the family in tight together and in a triangle shape really makes this shot. Well done! **//**



Lens	Canon EF 70-200mm f/2.8L IS USM
Exposure	1/500 sec, f/2.8, ISO400

SHOT OF THE DAY!



PHOTOGRAPHER'S APPRENTICE

APPRENTICE

NAME:

JOHN MEADS



CAMERA:

CANON EOS R5

JOHN IS a part-time carpenter, 67, based in Bromley, Kent. He enjoys photographing landscapes in his local area, and around the UK, such as recent trips to Glencoe and Northumberland. He also travels the world with his Canon camera in his spare time, with trips to such places as Salt Lake and Bolivia, and planned trips to Nepal. He asked for our help to really master his EOS R5 and RF lenses, and improve his landscapes.

GREAT GOWER SEASCAPES

Canon pro landscape and nature photographer Drew Buckley takes our Apprentice on tour of his favourite photo hot spots on the Gower coastline in Wales – from sunrise to sunset

CANON PRO

NAME:

DREW BUCKLEY



CAMERA:

CANON EOS R5

DREW IS a pro photographer based in Pembrokeshire, Wales. He has an expert eye for landscapes, seascapes, wildlife and astro. He runs workshops, guides for Canon on Skomer Island, and features in a wide range of publications, global photographic competitions, and is a regular *PhotoPlus* contributor. He's authored five books, such as the guidebook *Explore & Discover South Wales*, so he was the perfect choice to teach our Apprentice on the Gower coast. See his work at drewbuckleyphotography.com



PHOTOGRAPHER'S

TECHNIQUE ASSESSMENT

Drew helped Canon user John get more out of this pro-level full-frame EOS R5



MANUAL IS BEST

JOHN IS an accomplished amateur photographer, and comfortable shooting in Manual mode, so he could control the aperture shutter speed and ISO, but Drew reminded him of the importance of still using the exposure level indicator. "This just meant that once John in Manual mode had set a narrow aperture around f/11 or f/16 for good depth of field in his seascape scenes, he could then adjust the shutter speed up or down so the exposure level indicator is in the middle, for a good exposure," says Drew.



RAW QUALITY

IT'S ALWAYS best to shoot in RAW image format with your Canon camera, so that you're getting the highest quality images with the most pixel data. "This means you can reveal more shadow detail or detail in the highlights, and more colours when you're editing your RAW images," says Drew. "It's even more important when you're shooting landscapes and seascapes as you often have a lot of contrast between light areas in the sky or sea, contrasting with the darker areas of land in your frame."



HOT SHOT #1

TOP GEAR #1

Wellies in water!

DREW ALWAYS packs his Wellington boots in the back of his Land Rover Discovery as you'll never know when you'll need them, whether it's for trekking in deep snow, muddy trails, or in our case, being able to stand into the shallow waves for more dramatic images, without worrying about getting wet feet! "Wellies are essential when you're shooting by the sea, it really opens up the whole new range of photos while waves are lapping around your ankles," he smiles.



JOHN'S COMMENT



At 6am on a clear morning, Drew drove us to Bracelet Bay on the Gower to photograph the view across the coast to

Mumbles lighthouse. Drew had planned it for high tide, which he said hid loads of messy rocks in the foreground. We arrived 40 mins before the sunrise at 6:55am, to be greeted by vibrant colours already showing in the sky. We quickly set up our R5 cameras on tripods at the top of steps as the colours were changing and it was getting brighter by the minute! I followed Drew's lead and zoomed in at 70mm, and used a 6-stop ND filter for a long exposure of 80 secs.

GREAT GOWER SEASCAPES



EXPERT INSIGHT

PLAN LIKE A PRO

GREAT locations are the key to great landscape and seascape photos. Yet knowing which are the most photogenic locations is one thing, it's knowing how to reach the best places to shoot from, and what time of day, that really counts. Drew thoroughly planned the full day's itinerary for our Gower photoshoot, from sunrise at the Mumbles lighthouse, to sunset on Rhossili Beach, and had worked out tide times for each place at different times of day, and the position of the sun in the sky for the best possible photos.

Lens	Canon RF 24-70mm F2.8L IS USM
Exposure	80 secs, f/16, ISO100

PRO TIP

DIGITAL SPIRIT LEVEL

THERE'S nothing worse than wonky horizons in your seascape shots. The eyes are drawn to the uneven scene and it just feels awkward to the viewers. "I use the digital spirit level on the LCD on my R5 camera so the horizon against the sea looks nice and straight, and then your compositions look more pleasing to the eye. All it takes is a few tweaks of your knobs or dials on your tripod head to line up the digital level on screen."



TOP GEAR 2

Back to reality

SUCCESSFUL landscape photography starts with working out where the light angles will be and this is where apps such as PhotoPills come in handy, helping you to work out the best time to visit your location. "Even better is if you're at your location, you can use the built in Augmented Reality (AR) function on your smartphone's screen to truly work out exactly where the sun will be positioned."

HOT SHOT #2

Lens	Canon RF 24-70mm F2.8L IS USM
Exposure	2 secs, f/16, ISO100



JOHN'S COMMENT



It quickly became too bright to keep shooting towards the lighthouse, so we moved down to the beach to shoot a rocky seascape using the colour in sky to the right and away from where the sun was due to rise. Now shooting wider at 24mm on my RF 24-70mm, and with tripod legs dug securely into the sand, Drew showed me how to point my camera down to make the foreground rocks larger in the frame. Using a 6-stop filter I was now getting a 2-sec shutter speed, which was slow enough to capture movement in the lapping waves. By 8am the sun was well up and colour in the sky disappeared, so we headed back to the hotel for a big breakfast.

PRO TIP

SMARTPHONE SNAPS FIRST!

"I **OFTEN** take a test shot on my iPhone to see if the shot works from where I'm positioned. Modern smartphones, like my iPhone 14 Pro Max, have good cameras and software to capture vibrant HDR images, giving you an idea of what your edited RAW images could look like," smiles Drew.



EXPERT INSIGHT

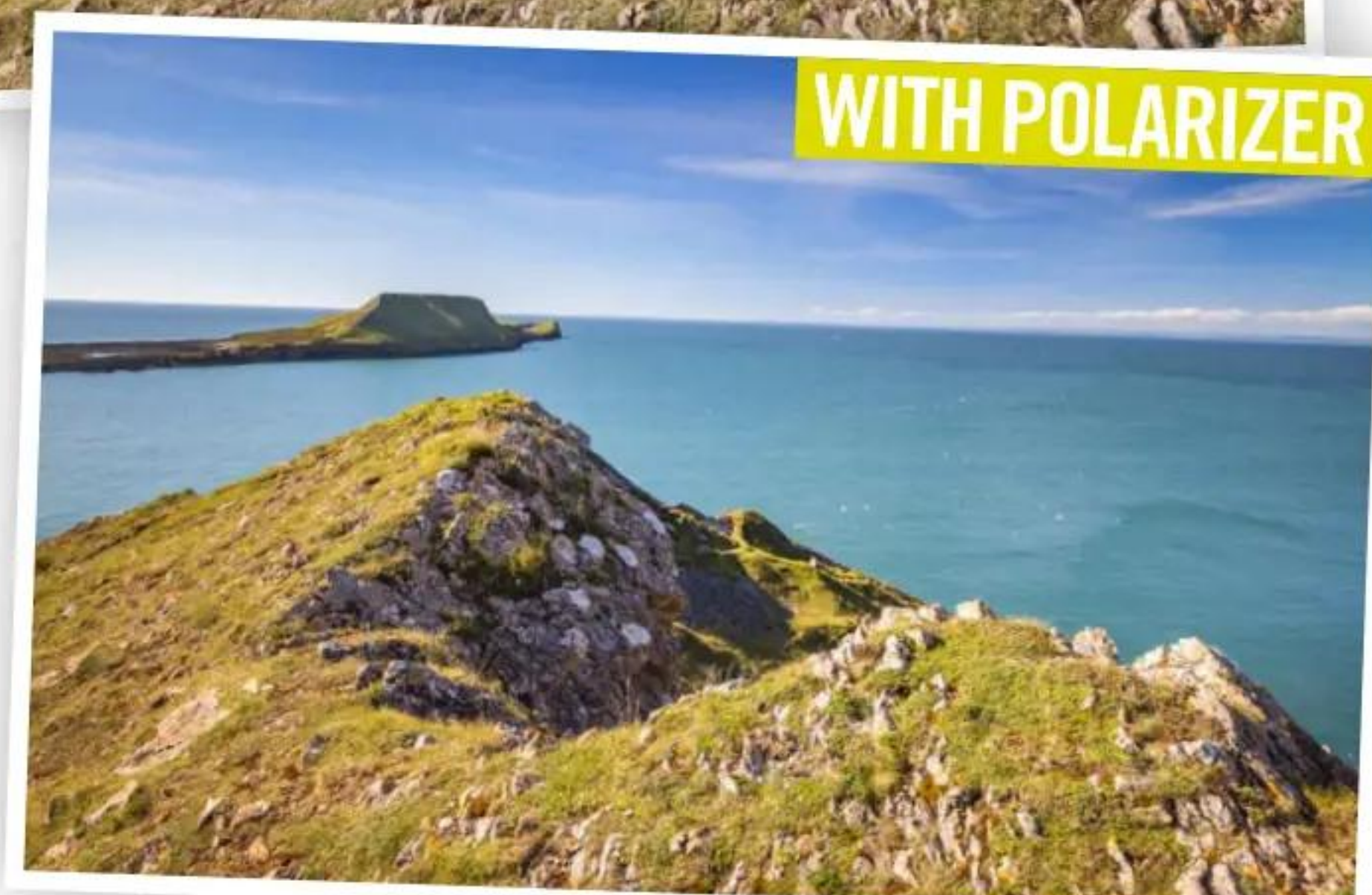
CIRCULAR POLARIZING FILTERS

IF YOU buy just one filter for your camera, make sure it's a Circular Polarizing Filter (CPL). It will help boost your sky colours, making the clouds pop out of the scene. It will also reduce surface reflections from water, wet sand and rocks, and even take the sheen off grass too, boosting the natural colours and overall improving your images. Drew uses Kase magnetic filters, and he can adjust his CPL by turning the red dial on the outside. Drew also uses circular magnetic 6-stop and 10-stop ND filters for long exposures. It's also easy to stack Kase CPL, ND Grad or ND filters together. More on Kase filters on the next page.

WITHOUT POLARIZER



WITH POLARIZER



HOT SHOT #3

Lens	Canon RF 15-35mm F2.8L IS USM
Exposure	1/25 sec, f/16, ISO100



JOHN'S COMMENT



// A 35-min drive took us to Drew's next location, Rhossili. We walked to the viewpoint, looking out to the Worm's Head, the most westerly tip of the Gower peninsula jutting out to sea. Drew explained the name comes from the Viking word 'wyrn' for dragon, and I could see why with its shape sticking out of the sea! This composition required some thought, as we had a big gap of sea between the rocky headland and Worm's Head in the distance. I used the grid in Live View to frame up using the rule of thirds, and found a vertical composition worked best, at f/16 and 24mm for good depth of field. I also used a Circular Polarizer to make the most of the side light, shooting the scene at 90 degrees to the sun, to boost the colours in the sky, and reduce reflections in the sea. **//**

TOP GEAR #3

Canon's pro zoom lenses

DREW USES Canon's top-level RF lenses with his R5 cameras. He loves Canon's pro L-series lenses because of the great image quality, they're super sharp, and they're built for all weathers. His Canon RF 24-105mm F4L IS USM has a broad zoom range, making it adaptable and an ideal lens to keep on all day or when travelling light as he treks along the coast. When he needs a wider angle of view when shooting closer to the waves, he often uses his Canon RF 15-35mm F2.8L IS USM.



PRO TIP

AUTO WHITE BALANCE



DREW PREFERRED to use the Auto White Balance (AWB) setting on his Canon R5 as he explains "The Auto WB setting on the R5 is brilliant. It often gets the image colour temperatures right – either warm or cool tones depending on the time of day and sunlight conditions. I use the AWB Ambience Priority for more natural results," says Drew.

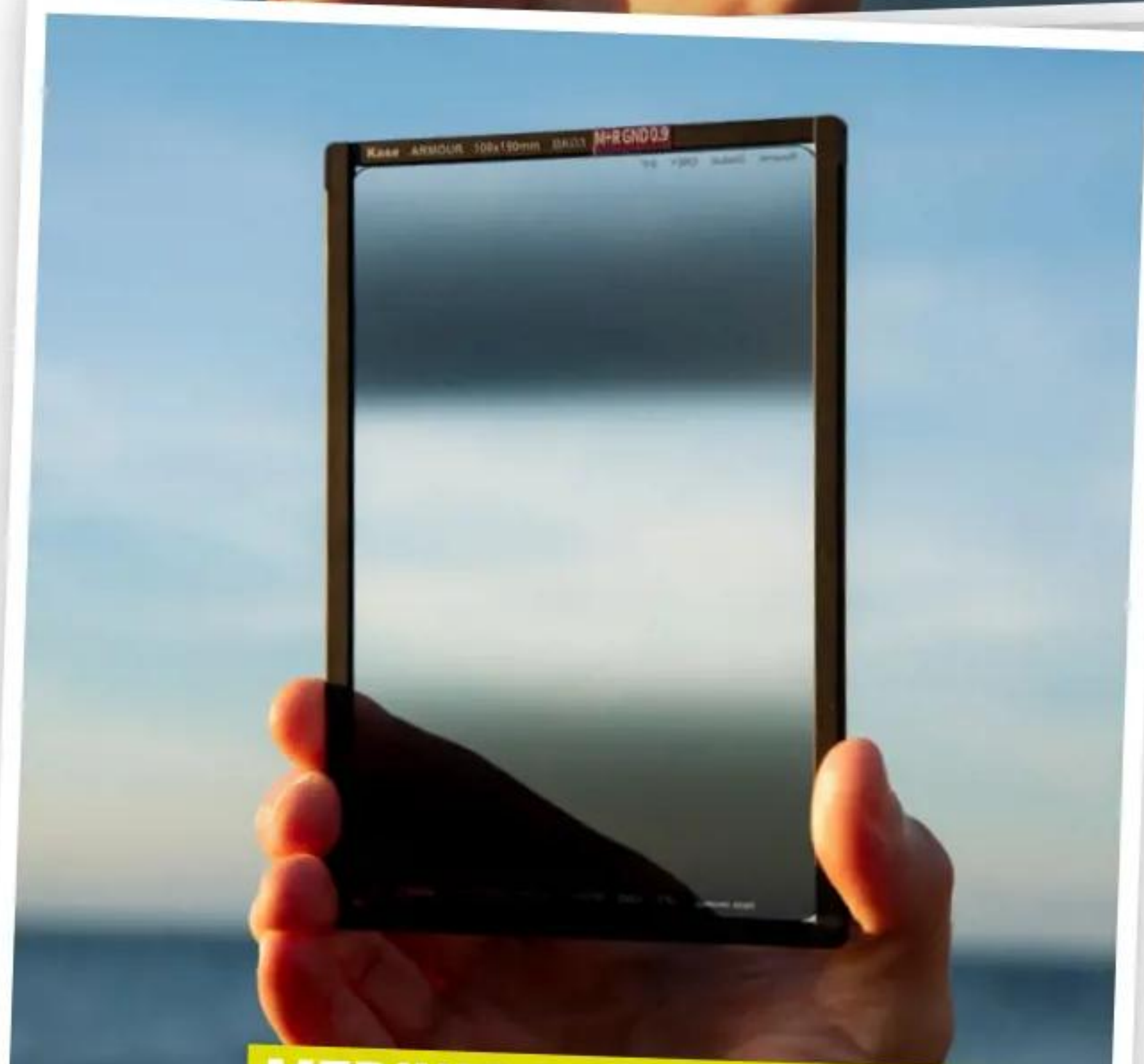
EXPERT INSIGHT

KASE ND GRAD FILTERS SYSTEM

BOTH John and Drew happen to use Kase filters, and Drew is also a Kase filters ambassador. You can see why they're popular as the Kase magnetic filters system is high quality glass, yet so neat and efficient.

"With the adapter ring on my lens, I can use the Armour 100x150mm 'double' ND grad filters to balance exposures of seascape scenes with bright skies – such as using the bottom of the S+H GND 0.9 3-stop double grad, which has a soft gradient on top, and harder gradient on the bottom for more defined horizons. I only use half of the filter over the frame, so I can quickly switch to suit the scene. I also use the M+R GND 0.9 3-stop double grad, which has a medium transition grad on the bottom, and a 'reverse grad' at the top which is great when it's very bright on the horizon – such as at sunset – but darker at top of the frame."

SOFT & HARD GRAD ND



MEDIUM & REVERSE GRAD ND



TOP GEAR #4

Tall and strong tripod

"PIN-SHARP" long-exposure images are created by using a solid base and this is where my sturdy Kingjoy C86 tripod comes in handy. It's carbon fibre, so it's strong and lightweight, plus me being taller than average, it extends to 180cm. That coupled in with the T40X ball-head, makes shooting at eye level a breeze," says Drew.



PRO TIP

ZOOM IN FOR CREATIVE SHOTS



DREW SPOTTED a shot by using his RF 100-500mm F4.5-7.1L telephoto zoom at around 175mm, framing up on some rocky wave-cut ledges. He focused on three ledges for a balanced composition, as usually odd numbers of things work best in photos. "I was going for a more artistic shot here, cropping out any distractions around the edges of the frame. I used a 6-stop ND for a 4 sec exposure at f/16, ISO50."

TOP GEAR #5

Long lens for seascapes

"THE THIRD" lens always in my kitbag is the RF 100-500mm F4.5-7.1L IS USM. I use less than my other two zooms, but I'm always thankful it's there. It packs a punch in focal length and is amazingly sharp too, helping to isolate crashing waves from a safe distance, abstract cliff textures, or just cherry picking that far away composition when I'm on a high viewpoint looking down across the bay," says Drew.



DREW'S COMMENT



Next I led John to Fall Bay, a trek over the otherside of the headland, down a steep path to rocky outcrops at sea level. The tide was still high, giving great opportunities of waves swirling around our seascape scenes. Setting up close to the waves rolling in, we made use of the late afternoon side light, shooting across the bay. With my RF 15-35mm wide-angle lens, I used a CPL to boost the colour in the skies and reduce the reflections on the rocks, and added a 6-stop ND to extend the exposure to around 3 secs, then timed my shots as the waves crashed against the rocks. I showed John how to focus a third into the scene for good depth of field.



HOT
SHOT
#4

Lens	Canon RF 15-35mm F2.8L IS USM
Exposure	3.2 sec, f/16, ISO100

SHOT OF THE DAY!

JOHN'S COMMENT



I really enjoyed the *PhotoPlus* Apprentice photo experience on the Gower coastline, we had some great weather conditions from sunrise to sunset, and Drew shared his knowledge and showing us several of his favourite locations. We were fortunate for this shot as the tide had gone out far enough to reveal the shipwreck, and coincided with colours becoming their most vibrant in the sky post sunset. With a 24-105mm lens with a CPL and 6-stop ND filters was enough for long exposures and motion blurring the sea. Drew showed me how to use the bulb timer built-in our R5 cameras as the shutter speeds were over the 30 secs maximum in Manual/Tv modes.

DREW'S VERDICT



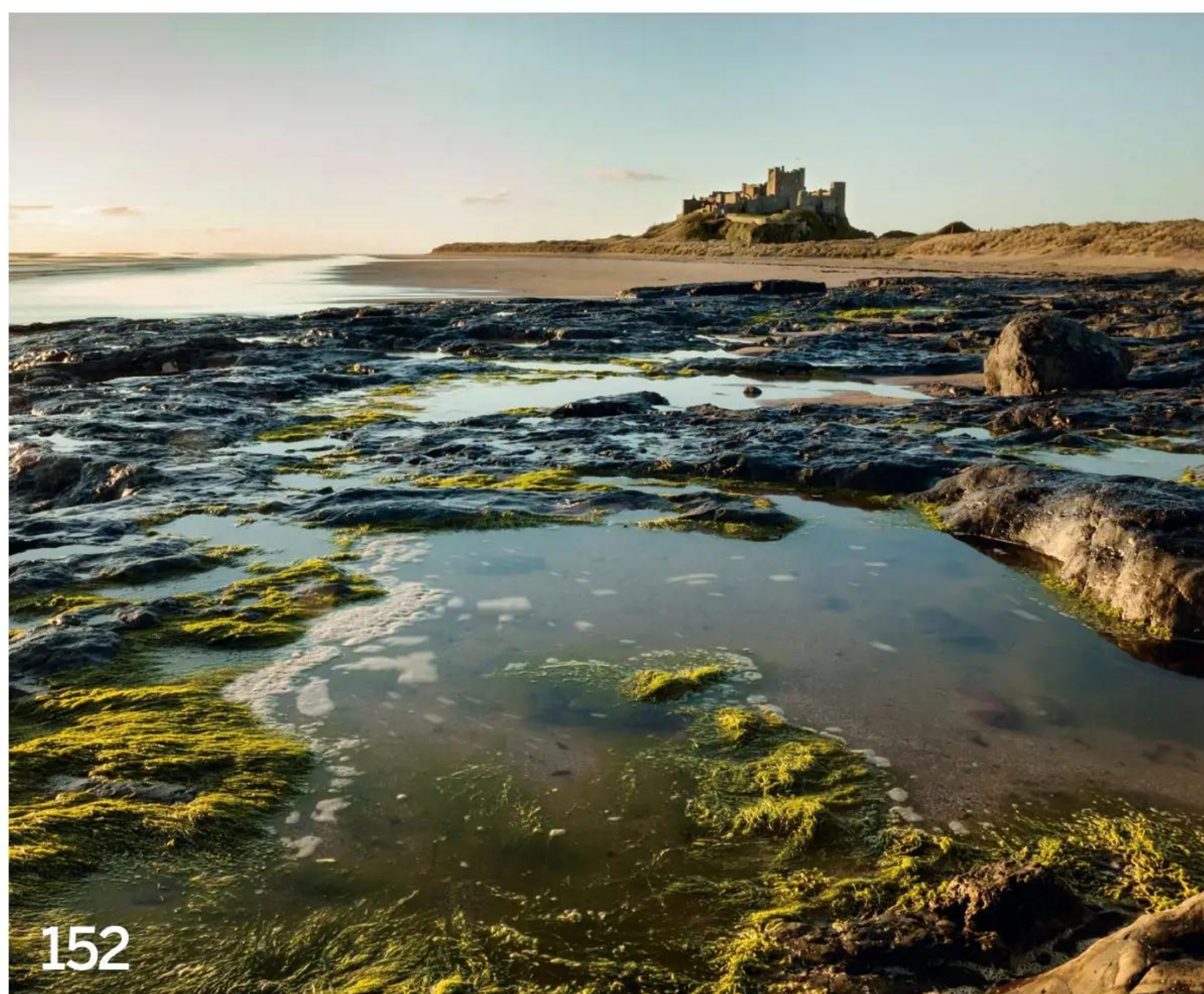
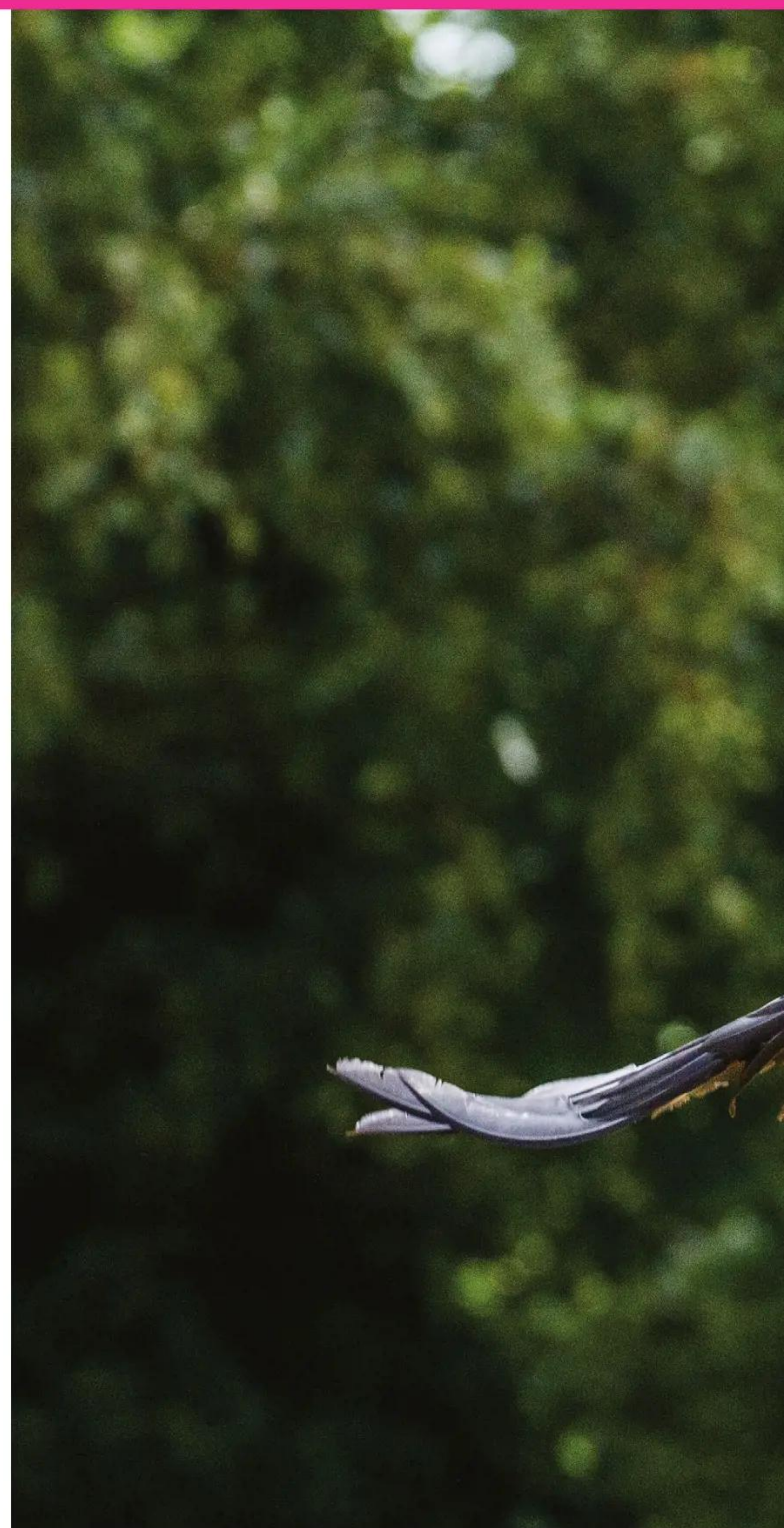
What a fantastic day John and I had. I don't think I've ever had such sunny conditions all day in Wales, with such colourful skies at both sunset and sunrise. We had to wait for the tide to go out to reveal the shipwreck on Rhossili beach of Helvetia, a Norwegian Barque ship that was wrecked on 1 November 1887. Luckily the afterglow of colours in the sky was at its peak well after sunset. This shot was taken at 19:59pm, when the sun set was at 19:28pm. I continued with my CPL and 6-stop ND killer combo, but to avoid exposures of 4-6 mins and missing the shot, I used an aperture of f/11 and increased the ISO to 200 – this still meant I had an exposure time of 85 secs.

Lens	Canon RF 24-105mm F4L IS USM
Exposure	85 secs, f/11, ISO200



Projects

The light fantastic	146
Perfect portraits	150
Hyperfocally speaking	152
Illuminate still life	156
Create brilliant black & white images	160
In-flight entertainment	164
Out of the shadows	168





164



168



146

THE MISSION

Learn how to paint with light and enhance the effect with reflections

Time needed
One hour

Skill level
Intermediate

Kit needed
Tripod • Remote shutter release
• Assortment of torches • LEDs • Coloured cups

The light fantastic

Armed with a few torches and LEDs, **James Paterson** spends an evening by a lake and explains how to create symmetrical light paintings

In 1882, pioneering photographer Georges Demy attached light bulbs to an assistant and told him to jump.

Ever since then photographers have been combining moving lights and long exposures to 'paint' with light. For a fresh approach to the technique, we thought why not use reflective surfaces to enhance the effect? Whether it be water, glass, mirrors or even simple Photoshop image-flipping, a little reflected

symmetry can take amazing light-painted patterns to a whole new level.

If you're new to light painting, you're in for a treat. It's one of those wonderful techniques that demonstrates just how exciting photography can be once you start experimenting with your exposure. A light painting is created by moving any light source through a dark scene while the camera's shutter is locked open. In exposure terms light is accumulative, so dragging a torch

across the frame is like taking chalk to a blackboard.

Besides a sturdy tripod, a dark environment and a few torches, the key here is your camera's Bulb exposure mode, which lets you lock open the shutter for as long as you like. With it we can take exposures that last for several seconds or even minutes. Once you get the basics right, the real fun is in experimenting with different light sources and moves to create wonderful patterns like this. So let's go...

STEP BY STEP GET SET UP FOR LIGHT PAINTING

Find out about the camera settings and gear you need to paint with light

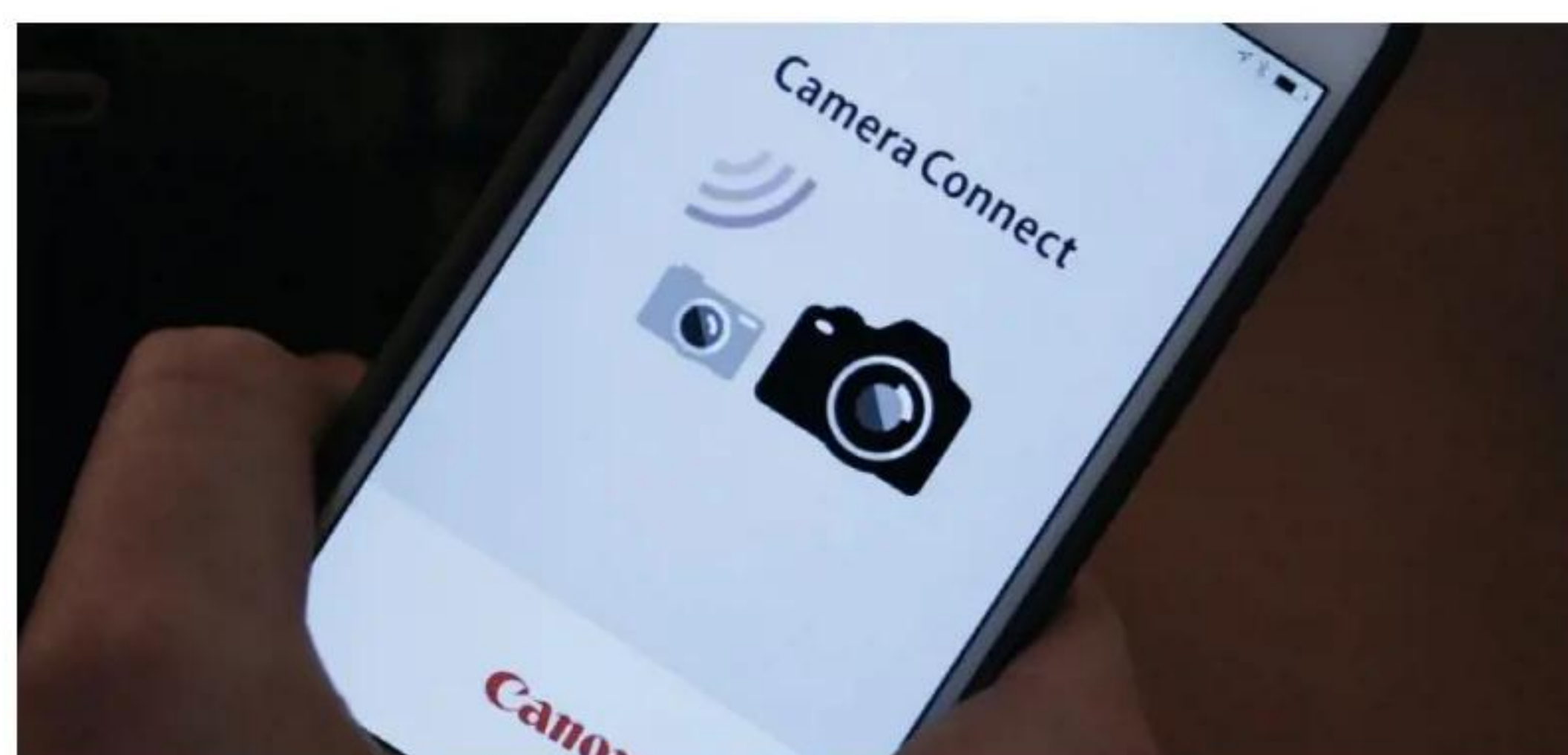
HOW DARK?

Light painting needn't be carried out in the pitch black. In fact, a little dim ambient light will help enormously, as you can see what you're doing. But the longer the exposure, the more the ambient light plays a part and the lighter the scene will be. You can see in the main image here that the glow from the city beyond the lake has lightened the sky. To the naked eye it was nowhere near as bright – but when exposed for a hundred seconds, it becomes much brighter.



01 COMPOSE AND FOCUS

Set up on a tripod. It can be tricky to get the framing right so compose loosely. We don't want the lens hunting for focus, so pre-focus on a point in the scene then switch to manual focus to lock it.



03 LOCK THE SHUTTER

We need a remote release to lock open the bulb exposure, either a cable release or – even better – a wireless one. DSLRs with Wi-Fi can be triggered with a smartphone and Canon's Camera Connect app.



02 SET BULB MODE

DSLRs max out at 30 seconds, which usually isn't long enough. For more time set Manual mode and dial the shutter speed down to Bulb. This way the shutter stays open for as long as the button is engaged.



04 TAKE A TEST SHOT

Take a test shot to work out the ISO and aperture. Start at ISO100 and f/8, then start a Bulb exposure and try shining your light sources. If it's too dark, open the aperture or bump up the ISO.

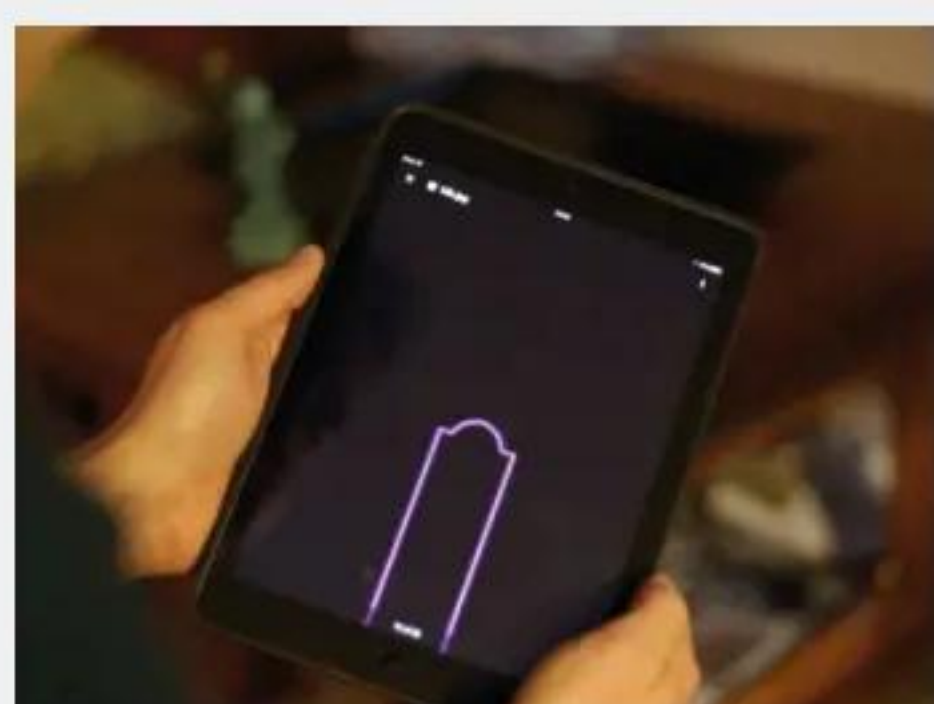


ESSENTIAL KIT DIY LIGHT-PAINTING GEAR



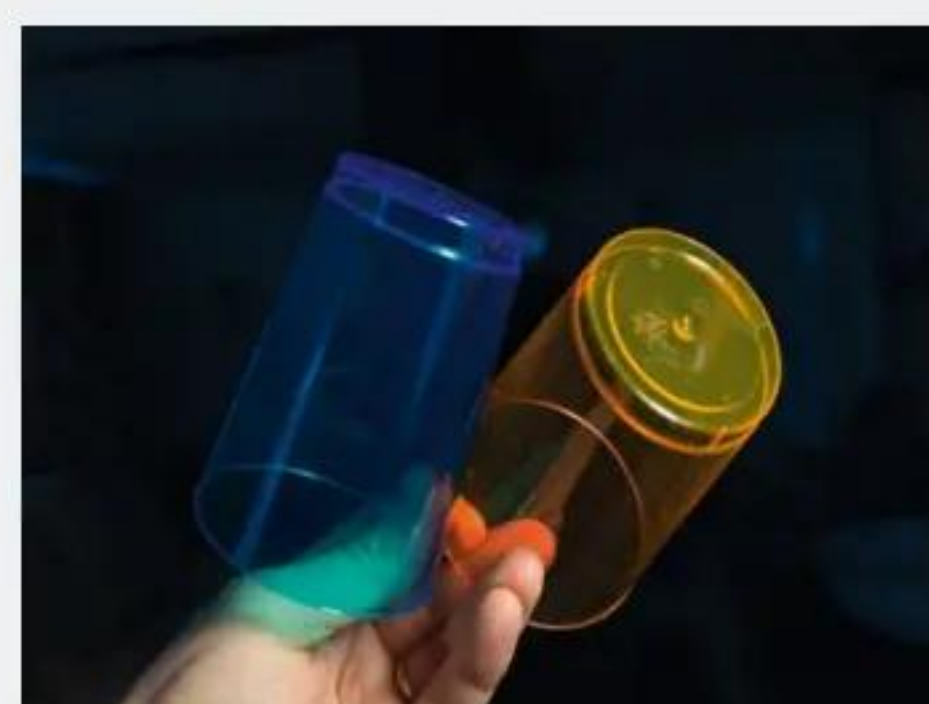
01 TORCHES

An LED torch is a good choice for light painting, as they're usually fairly strong, and you can shine them through coloured materials. For smooth flowing lines, attach them to a rod or piece of string.



02 IPAD

Tablet and phone screens can emit plenty of light, so you could use on-screen images to create all manner of light painting effects (such as the New York skyline you'll see over the page).



03 COLOURED CUPS

There are lots of specialist light-painting products out there, but you probably have items around the house that will work just as well. Taping a torch to a standard coloured cup worked for us.



04 PHONE TORCH

Moving around in the dark, particularly near water, is tricky. A weak light such as your phone's lock screen will help and shouldn't show in the exposure if you shield the screen from the lens.



05 LIGHTSABRE

Kids' toys, such as lightsabres or other light-emitting wands, are great for light painting. They also make it easier to create smooth, flowing shapes, as you can swing them in steady arcs.

PROJECTS



SETUP 1 SYMMETRICAL CREATURES

After positioning the camera across the water and locking open the shutter, we used a torch and coloured cups attached to a tripod leg to paint half a moth-like shape, starting at the surface of the water. The reflection did the rest. You need to keep a mental picture of the object as you paint with the torches. It's a bit of a guessing game, but each time you try you learn something, and the next attempt is usually better.

Kit needed: Tripod, remote release, torch and coloured cups

Exposure: 97 secs, f/6.3, ISO100



SETUP 2 iPad CITYSCAPES

Whether painting outside at night or indoors in a dark room, you can get some amazing effects with a little time and effort. Here we placed a small Statue of Liberty figure in the foreground with a tray of water behind it. Then we used an iPad screen to paint the buildings. We made a set of images of simple outlines for each individual building, then by scrolling through the images while shifting the iPad across the water, we could create the city, one building at a time. A few torch flashes in the background completed the effect of lights.

Kit needed: Tripod, remote release, tablet, torch, tray of water

Exposure: 131 secs, f/13, ISO100



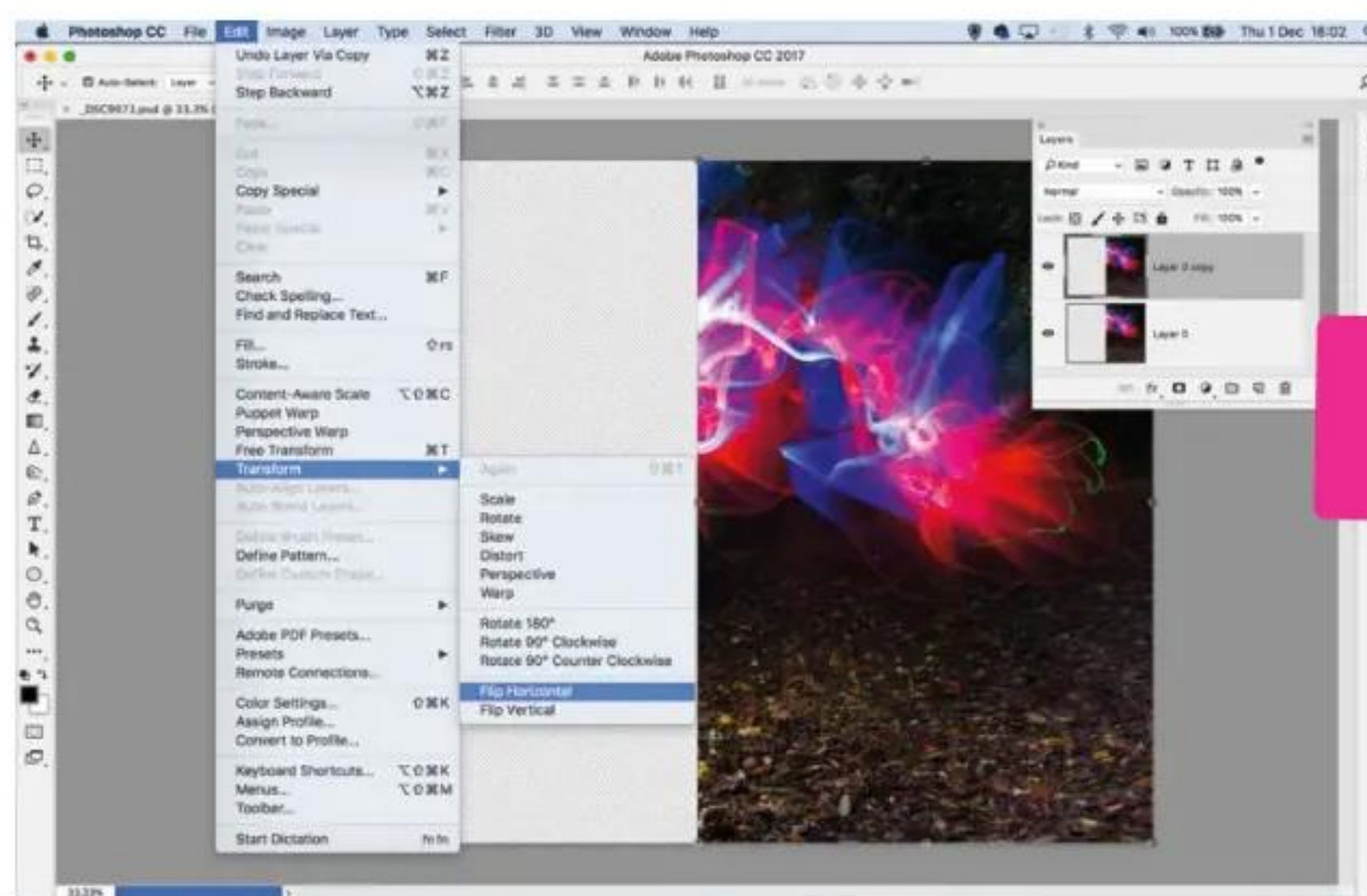
THE LIGHT FANTASTIC

SETUP 3 SINISTER SILHOUETTES

You can have lots of fun with light painting by creating silhouettes, like this sinister-looking figure. All you need to do is move the lights behind a person while they stand perfectly still. Here we took our time, swinging a set of double torches around behind the figure and making sure the entire area behind his body was painted. Once done, we used a green coloured cup in front of the face, flashed twice to create his glowing green eyes.

Kit needed: Tripod, remote release, torch and coloured cups

Exposure: 160 secs, f/6.3, ISO100



SETUP 4 PHOTOSHOP FLIP

While this project is all about using reflections, sometimes there won't be any to hand, so instead you could try image-flipping. Here we light painted with a toy lightsabre and once flipped, it looks almost like one of those ink-blot Rorschach tests psychologists use – we see a looming monster, but that's just us. To flip an image in Photoshop CC or Elements, duplicate the background layer with Ctrl+J then grab the Crop tool and drag out to double the image width. Go to Edit>Transform>Flip Horizontal, then use the Move tool to drag the layer across to the other side.

Kit needed: Photoshop

Exposure: 76 secs, f/8, ISO100



THE MISSION

Get started with a home studio flash kit and take a flash-lit portrait

Time needed

One hour

Skill level

Intermediate

Kit needed

Home studio flash kit with two heads

Perfect portraits

James Paterson sets up a home studio flash kit for beautifully lit portraits

For those just getting started with studio lighting, things can seem a little daunting.

But fear not: we'll explain how to get set up, which camera settings to use, and how to build a classic lighting setup in minutes.

Home studio flash kits, such as the Elinchrom D-Lite set we used,

bring huge benefits compared to flashguns. Firstly, they give you greater control over exposure. They're more powerful, meaning you can get away with lower ISOs, so you get high-quality images with less noise. And changing the flash power effectively gives you control over depth of field, as you can increase power and close the

aperture for more, or lower the power and open up the aperture for less, so you get to decide what's sharp or soft.

But the biggest advantage is the control they give you over the quality of light. You can choose to have the light harsh or diffuse, spread wide or in a narrow beam, and emitted from any angle.

STEP BY STEP SET UP YOUR STUDIO FLASH KIT

Learn how to build lighting and use the correct camera settings for flash



01 CONTROL THE LIGHTS

A typical home studio kit comes with two flash heads, stands and softboxes or umbrellas. One flash head is triggered either with a sync cable or wireless trigger. Set the others to Slave mode so that they fire upon detecting the first flash.



02 ADJUST THE FLASH POWER

Studio heads enable you to increase or decrease light power. Our Elinchrom heads go from 2-6; each numeral doubles power, from 1/16 power (2) to full power (6). Alternatively, change the distance between light and subject to alter the power.



03 USE LIGHT MODIFIERS

Studio lights come with various modifiers and accessories – like this softbox and umbrella – giving control over the quality and spread of the light. The modelling light – a constant bulb next to the flash bulb – gives an idea of the effects of a modifier.



04 SET YOUR EXPOSURE

Set Manual mode and ISO100, with the shutter speed set to your sync speed (usually 1/200 or 1/250 sec) and aperture to f/8. Fire a test shot; if it's too light lower the flash power, increase the f-number or move the light further away, or vice-versa.



05 CLASSIC KEY AND FILL

Turn on one light – a softbox above the face here – and expose for it. Next turn on the second light – an umbrella from below here – and turn off the first. Aim for about 1-2 stops of underexposure. Now with both lights on you'll have a key and fill setup.



06 GET THE HIGH KEY LOOK

Here one softbox lights the face, while an umbrella is angled at the background. The umbrella is fired at a higher power than the softbox, so it blows out the background. A little reflected light also creates a nice highlight along the cheek.

QUICK TIP!

Don't bother with sync leads – buy an inexpensive wireless flash trigger instead and free yourself from trailing leads

SOFTBOX OR UMBRELLA?

Home studio kits typically come with umbrellas, softboxes or sometimes both. Both soften the light, which is usually good for portraits. But there are subtle differences – the shadows change between the umbrella and softbox. The shadow is deeper on the softbox. That's because umbrellas throw light around everywhere, and it bounces off surfaces to fill out the shadows. With a softbox the spread is narrower, so there's more control over the shadows. Portrait photographers generally prefer softboxes; they also give attractive square catchlights in the eyes.



THE MISSION

Shoot a perfectly sharp landscape with the hyperfocal distance technique

Time needed
One hour

Skill level
Advanced

Kit needed
Tripod • Hyperfocal distance chart or smartphone app

Hyperfocally speaking

Take depth of field a step further, we explain how to shoot a pin-sharp landscape, from the nearest rock pool to the distant castle

Getting your landscapes completely sharp is tricky, but exploiting a phenomenon of depth of field can help you get a tack-sharp scene every time.

Depth of field is the distance either side of the focal point that is 'acceptably sharp'; it's determined by aperture, focus distance and focal length, and extends twice as far behind the focus point as it does in front. The point of using

hyperfocal distance focusing is to focus at the point at which the depth of field stretches to 'infinity' – but not beyond – so that the maximum possible amount of the scene appears sharp.

You get a greater depth of field at shorter focal lengths and narrower apertures – so, if you shoot at an aperture of f/16 with a 16mm wide-angle lens on a full-frame camera, the hyperfocal distance is 50cm. Focusing at this

point will make everything from roughly half this distance (25cm) to infinity appear sharp.

Before dialing in your lens's narrowest available aperture, you need to take 'diffraction' into account, as images become progressively softer at narrow apertures, due to light being diffracted by the aperture blades. This becomes noticeable beyond around f/16 on an APS-C sensor, or f/22 on a full-frame sensor.

STEP BY STEP HYPER-SHARP SCENIC SHOTS

Learn landscape shooting skills to capture the maximum possible depth of field



01 A STEADY HAND

Shooting with a tripod not only keeps the camera rock-steady for long exposures, it also grants more time to perfect composition and enable precise focusing, so we can set hyperfocal distance with care.



02 KEEP IN CONTROL

Swapping to Manual mode gives you complete control over your exposure. Set the focal length to fit your scene – we shot at 24mm – but bear in mind that the wider the angle, the greater your depth of field will be.



03 WORK OUT THE HYPERFOCAL DISTANCE

Use your hyperfocal distance app (or our tables) to cross-reference your focal length (24mm in our case) and desired aperture. Shooting at f/16 on our full-frame Canon, gives us a hyperfocal distance of 1.1m.



04 MEASURE IT OUT

Everything from around half the hyperfocal distance (in our case 55cm) to the horizon will be sharp. Unless you're carrying measuring tape, you'll need to judge the hyperfocal distance by eye, or roughly pace it out.



05 ACCURATE FOCUS

Use autofocus on a point at the hyperfocal distance, then switch to manual focus to lock it in (try focusing on yourself with a remote release). For our shot of the castle (left) we focused on the first rock pool.



06 BEAT THE SHAKES

You'll need to avoid touching the camera to prevent camera shake, so use a remote release (or the 2-sec Self-timer Drive mode). Disable image stabilization – this can cause shake when not shooting handheld.

BUT IS IT ACCEPTABLE?

A lens can only focus at one point at a time, and only objects at this distance will be precisely in focus. However, some of the area in front of and behind this will be of acceptable sharpness – where the degree that the image is defocused is negligible at a normal viewing distance. When shooting with a wide-angle lens and at a narrow aperture, the area of acceptable sharpness can stretch from just a few centimetres in front of the camera all the way to infinity.

TO INFINITY AND BEYOND

Infinity is the point beyond which everything appears at equal sharpness – it varies according to focal length, but can be as little as a few centimetres away on a wide-angle lens. When you focus at the hyperfocal distance, everything from half this distance up to the infinity mark – and beyond – will be acceptably sharp.

PROJECTS



SETUP 1 UP CLOSE

In this image our foreground subject was just half-a-metre away. We have achieved an acceptable level of sharpness across the far distance by using a narrow $f/16$ aperture along with a wide (19mm) focal length. As shown in the chart (right), wider focal lengths provide a closer hyperfocal distance, and thus a greater depth of field. For this image we focused on the edge of the foreground bail; the resultant depth of field stretches along the entire 'face' of the bail, ensuring both it, and everything beyond it as far as the eye can see, appears nice and sharp.

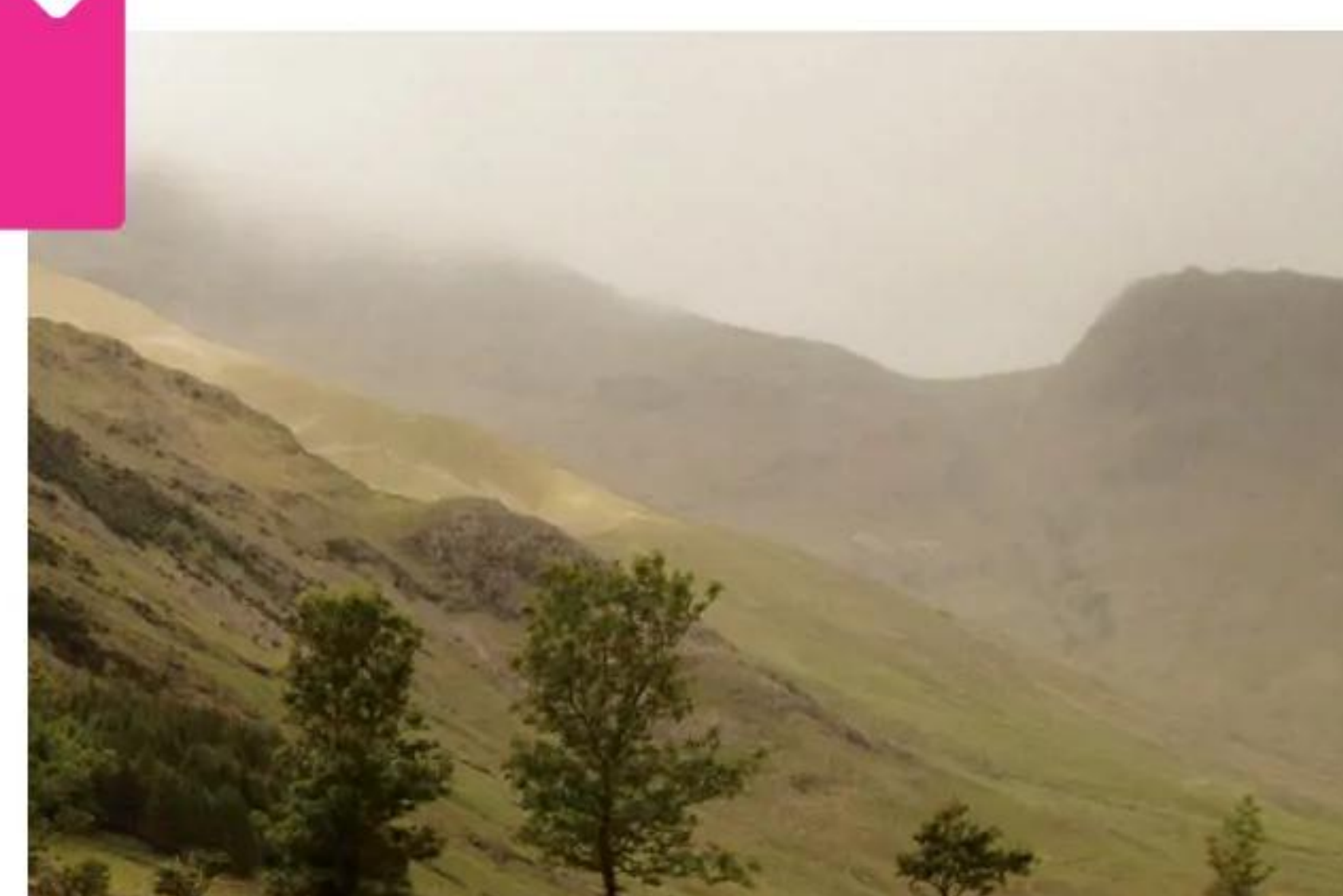
EXPOSURE 1/160 sec, $f/16$, ISO50



SETUP 2 FURTHER AFIELD

Our second example is of a slightly wider landscape. This time around, we're not shooting quite so close to our foreground interest. We have still used a wide (22mm) focal length to fit in the whole scene, but can get away with a wider $f/8$ aperture and still provide acceptably sharp detail throughout the frame, from the tree and wall in the foreground to the distant mountains. As the effects of diffraction are less apparent at wider apertures, and lenses generally sharper at around $f/8$ - $f/11$, you'll get a sharper image if you shoot at mid-range apertures.

EXPOSURE: 1/400 sec, $f/8$, ISO50



GO THE FULL DISTANCE

USING OUR hyperfocal charts – or a smartphone app – gives the distance to focus at from the focal plane of the camera, so that everything between it and 'infinity' will appear sharp. However, because depth of field stretches in front of the hyperfocal distance point, as well as beyond it, objects up to around half this distance will appear acceptably sharp, too. So if you were to use a 50mm focal length focused at 14 metres away at f/5.6 on a full-frame camera, a subject between roughly seven and 14 metres would also appear acceptably sharp – enabling you to get more benefit from the depth of field.

SOFTWARE HYPERFOCAL DISTANCE CALCULATORS

You don't have to carry around charts and tables – your smartphone can be your constant hyperfocal calculator companion

THERE ARE plenty of smartphone apps that will calculate the hyperfocal distance for you on both iOS and Android – we used free app HyperFocalPro on Android, downloaded from Google Play, which we found simple and straightforward to use. You can input your camera model, focal length, aperture and the subject distance. With all of this information, the app generates a 2D diagram, showing the depth of field and the hyperfocal distance, for you to better understand the information. There is also a table view for the selected camera, and this can be simpler to use if you do not know the exact subject distance but want to guesstimate. The best thing about this app is that, once installed, it does not need an internet connection when out and about, making it useful for use in the field without racking up excessive data charges.



READING HYPERFOCAL CHARTS

It's complex, but we've done the maths so you don't have to...

WE'VE PROVIDED tables for full-frame and APS-C sensors. Select your focal length on the horizontal axis and aperture on the vertical axis to see how far from the camera you should focus, in metres, for maximum sharpness all the way up to the horizon. For an interactive chart, where you can input your own focal lengths, see <http://bit.ly/hypercalc>

FULL-FRAME SENSOR TABLE

	16mm	24mm	35mm	50mm	85mm	135mm	200mm
f/2.8	2.9	6.4	13.7	27.9	80.6	203.4	446.4
f/4	2	4.5	9.6	19.5	56.4	142.4	312.5
f/5.6	1.4	3.2	6.8	14	40.3	101.7	223.2
f/8	1	2.3	4.8	9.8	28.3	71.2	156.3
f/11	0.7	1.6	3.5	7.1	20.5	51.8	113.6
f/16	0.5	1.1	2.4	4.9	14.1	35.6	78.1
f/22	0.4	0.8	1.7	3.6	10.3	25.9	56.8
f/32	0.3	0.6	1.2	2.4	7.1	17.8	39.1

APS-C SENSOR TABLE

	16mm	24mm	35mm	50mm	85mm	135mm	200mm
f/2.8	4.6	10.3	21.9	44.6	129	325.4	714.3
f/4	3.2	7.2	15.3	31.3	90.3	227.8	500
f/5.6	2.3	5.1	10.9	22.3	64.5	162.7	357.1
f/8	1.6	3.6	7.7	15.6	45.2	113.9	250
f/11	1.2	2.6	5.6	11.4	32.8	82.8	181.8
f/16	0.8	1.8	3.8	7.8	22.6	57	125
f/22	0.6	1.3	2.8	5.7	16.4	41.4	90.9
f/32	0.4	0.9	1.9	3.9	11.3	28.5	62.5



THE MISSION

Use different lights to shoot still-life setups at home

Time needed
Half a day

Skill level
Intermediate

Kit needed
Kit or macro lens • A pair of desk lamps • An assortment of coloured and white paper • Black material • Torch • Light tent • Tripod • Remote shutter

Illuminate still life

Master a selection of different lighting techniques to shoot four still-life photography projects in the comfort of your own home

The key to successful tabletop home studio photography is the lighting, and how to use it to create a variety of effects without spending a fortune on professional equipment. So in this project we're going to look at four simple setups that anyone can shoot,

covering everything from making your eBay listings look more attractive to arty shots of fruit and flowers. We'll use a variety of light sources – window light, a pocket torch and couple of lamps (we used LED lights, but anglepoise desk lamps will do). A macro lens is great for getting close to still-life subjects, but you

can use your kit lens to shoot all four setups. You'll also benefit from a few inexpensive extras – such as some fabric and paper for the backdrops, a reflector and a light tent for creating a more even lighting for some of our close-up setups. So, clear some space on the kitchen table and rig up your own still-life studio.

TABLETOP STUDIO STILL-LIFE PHOTO ESSENTIALS

All these items will come in handy when you're shooting objects in your home studio

01 CONSTANT LIGHT SOURCES

We used a couple of Manfrotto LED lights, but anglepoise lamps with flexible heads that let you direct the light are ideal for small home studio projects. Using two gives foreground and background lighting, and boosts ambient lighting on dull days.

02 DARK MATERIAL

A piece of black material absorbs light, so when lit correctly it looks as though a subject is literally floating in black. Black velvet is the best fabric to use – buy a couple of metres at a material shop, but make sure you don't buy the crushed sort!

03 TORCH

Light painting is a quick, easy way to manipulate the light in exactly the way you want. A small but powerful pocket torch, such as a Maglite, can be directed as needed, and a focusable beam gives you complete creative control.



04 A2 SHEET OF PAPER

An inexpensive and easy solution for creating backdrops, as well as being cheap and readily available from art stores, a large, heavyweight sheet of paper with a matte and subtly textured finish will help to avoid reflections.

05 LIGHT TENT

These simple translucent structures are great for cutting out reflections and creating even lighting for product photography – using nothing but natural light from a window. You can pick up a small light tent for as little as £30/\$45.

06 REFLECTOR

Even with diffused light, shadows can be a real issue, but this can easily be resolved with a small reflector. For still-life projects, look for one with silver and white surfaces. You can pick up a Westcott 20-inch 2-in-1 Silver/White Reflector for £15/\$15.

PROJECTS



SETUP 1 STOCK SHOTS

Get set up close to a window; position a piece of white paper up and over a cereal box to create an 'infinity curve', which gives a seamless backdrop. Arrange your background and subject so that, once framed, it will be surrounded by white. Check how the lighting falls; you want it to be as even as possible – if your subject is casting shadows, a reflector can be used to fill them in. If you don't have a reflector, a simple sheet of white paper will do.

Kit needed: Sheet of white paper, reflector, tripod, remote release

Exposure: 1/13 sec, f/7.1, ISO100



SETUP 2 EBAY IMAGES

Set up a light tent on a table so that the open side is at a right angle to the window. The ambient light will be just enough to create a good softened light; you won't need any torches or lamps. The light tent not only diffuses the daylight but also helps to reflect some light back at the subject. Now arrange a small item inside the tent. If there is a lot of glare on the surface, rotate the tent slightly away from the window to soften the light further.

Kit needed: Light tent, tripod, remote release

Exposure: 1/2 sec, f/11, ISO100





SETUP 3 STILL-LIFE FLOWER

Prop up some coloured card (pick a complementary colour to your flower) to create the backdrop, ensuring it fills the frame when looking through the viewfinder. Place your flower in front of the card, with enough space to position one of the lamps behind it, pointing upwards and towards the card for your backlight. Place the second lamp in front of the flower, just off to one side. Close the curtains to reduce the ambient light.

Kit needed: Sheet of coloured paper, two lamps, tripod, remote release

Exposure: 1 sec, f/8, ISO100



BEAT THE SHAKES

Still-life close ups require narrow apertures for a reasonable depth of field, so your exposure times will be longer. There are two essential pieces of equipment that will enable you to capture pin-sharp shots: a tripod and a remote shutter release, which will enable you to fire the shutter without directly touching the camera and inadvertently joggling it. If you don't have one, use the 2-sec Self-timer drive mode instead.



SETUP 4 FLOATING FRUIT

Drape a piece of black material over a box, ensuring that you have a good length in the foreground to place the fruit on, so that once composed the subject will be surrounded by black. Position the fruit in the middle of the cloth. Make the room as dark as possible, so that the only light shining on the fruit is that produced by the torch. Hold thin paper (a cupcake case is ideal) in front of the torch to diffuse the light; this will reduce reflection on the skin of the fruit.

Kit needed: Black material, torch, cupcake case, tripod, remote release

Exposure: 1 sec, f/9, ISO100





THE MISSION

Discover the joys of black-and-white photography, from shooting different subjects to killer mono conversions

Time needed
1-2 hours

Skill level
Intermediate

Kit needed
Photoshop CS/CC

Create brilliant black & white images

You can't beat black and white for adding real impact to your images. We reveal the best ways to convert your colour shots to monochrome

Seeing the world devoid of colour could be construed as rather depressing, however, as we're setting out to prove, black and white is actually a way to enhance the world around you – and a brilliant way to improve your photos.

By nature and design, colourful objects stand out in your shots – and sometimes they stand out in a *bad* way. By converting your colour shots to black and white, you remove colour as a distraction, and the eye then homes in what's the most dominant part of your shot

– be it a tall building, a person's face, or tree in a landscape.

A monochrome image also only deals in tones; a mixture of various degrees of highlights, midtones and shadows. So you need to be creative and use light effectively in your shots so the main subject or focal points are most prominent.

Although your Canon DSLR has a Monochrome preset picture style, it only offers a fairly functional in-camera black-and-white conversion. It is useful, however, to act as a preview on the LCD to show how a shot will roughly look in mono. Also remember that,

when you shoot in Raw, your picture style will be previewed on your camera's LCD, and recognised if you open your Raw images in Canon's Digital Photo Professional on your PC – but won't be recognised when you open the image in Photoshop.

So we often shoot in Raw+JPEG, that way, we have the in-camera black-and-white converted JPEG for reference, but also a full-colour Raw file with which to carry out a more-careful conversion on my computer, using software such as Photoshop (see over the page). This gives greater control over monochrome conversions.

HOW TO UTILISE BLACK & WHITE CONVERSIONS

Make the most of your photos by releasing their full potential with a mono conversion

Don't get the wrong idea: we're not saying that black-and-white conversions are a way to rescue rubbish colour photos. Far from it. What we are saying is that black and white can sometimes be the best way to turn a *good* shot into

a *great* one. An example is dull, overcast weather: under this flat lighting, scenes tend to look boring, plus there isn't actually that much colour to enhance, so why not simply remove it? By making a virtue of the lack of colour, you can

concentrate on working on the tones, by brightening highlights and midtones, and darkening shadows. Sharpening black-and-white images can really bring out detail and boost contrast more effectively than in a colour shot.

QUICK TIP!

A black-and-white conversion can work well when you're taking photos in high-contrast mixed lighting



01 BUILDINGS ARE BETTER IN B&W

A near-white sky is improved with a mono conversion, while you can boost shadows and sharpen to enhance structural detail.



02 BLACK & WHITE BOUDOIR

A subject in front of a bright window often means disaster – but a monochrome makeover accentuates the model's shape.



03 ACTION-PACKED MONOCHROME

Sporty shots don't have to be full of colour – with it removed and the shot sharpened, this rider, bike and dirt jump out at you.

STEP BY STEP SET THE MONOCHROME PICTURE STYLE



01 RAW+JPEG

Select RAW+JPEG image quality, so in conjunction with the Monochrome picture style, you'll get a converted black-and-white JPEG, but still have a full-colour Raw file, should you need it.



02 MONOCHROME STYLE

Press the Picture Style button (or find the option through the Quick Control Screen or menu system), then scroll through to highlight M for Monochrome, and press the Set button to select it.



03 CUSTOMISE STYLE

You can also customise the Monochrome picture style. With M highlighted, press Info to change the settings. For monochrome boost Sharpness up a click, and put Contrast up to near maximum.



04 FILTERS & TONING

In the Monochrome picture style, you also have Filter Effects (Yellow, Orange, Red, Green) and Toning Effects (Sepia, Blue, Purple, Green). The Blue effect works well for a cool B&W look.



05 PICTURE STYLE FILES

You can also download more picture styles for further options. These can be applied via the free Canon Picture Style Editor software, as well as to your DSLR itself. See http://bit.ly/pic_styles

PROJECTS

BLACK & WHITE IS BEST FOR PORTRAITS

Learn four different approaches to transforming your colour portraits



FLOWERS IN MONOCHROME

Although it might seem somewhat radical to convert a vibrant, colourful shot of a flower to black and white – by going against the norm, you can create strong, visually arresting images. Without colour distracting your eye, the tones and stripes on the flower's petals stand out, and the background instantly becomes second-best in the mono conversion, compared to the green backdrop of the colour shot.



01 FAB FAMILY PORTRAITS

Try converting family portraits to black and white. Stripping out distracting colour in backgrounds behind people is also a great solution for ensuring the eye remains on your subjects. This mono conversion also removes the colour from the little girl's clothes.



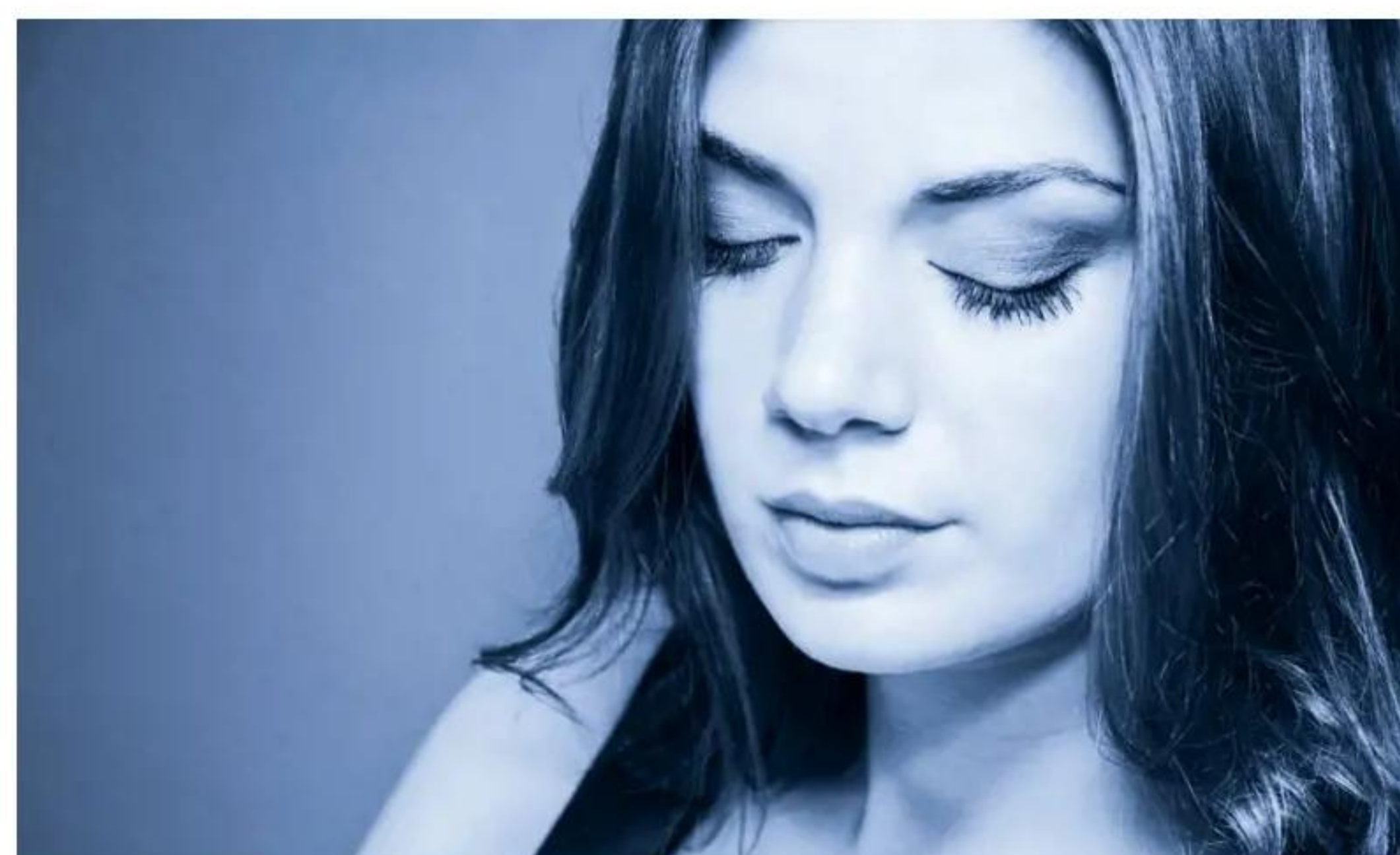
02 DRAMATIC BLACK & WHITE

You can make portraits look more dramatic when converted to black and white, with more control over creating flattering skin tones when processing shots, as well as lightening them in a high-contrast finish. All this combined creates a great, timeless portrait.



03 GET THE DESATURATED LOOK

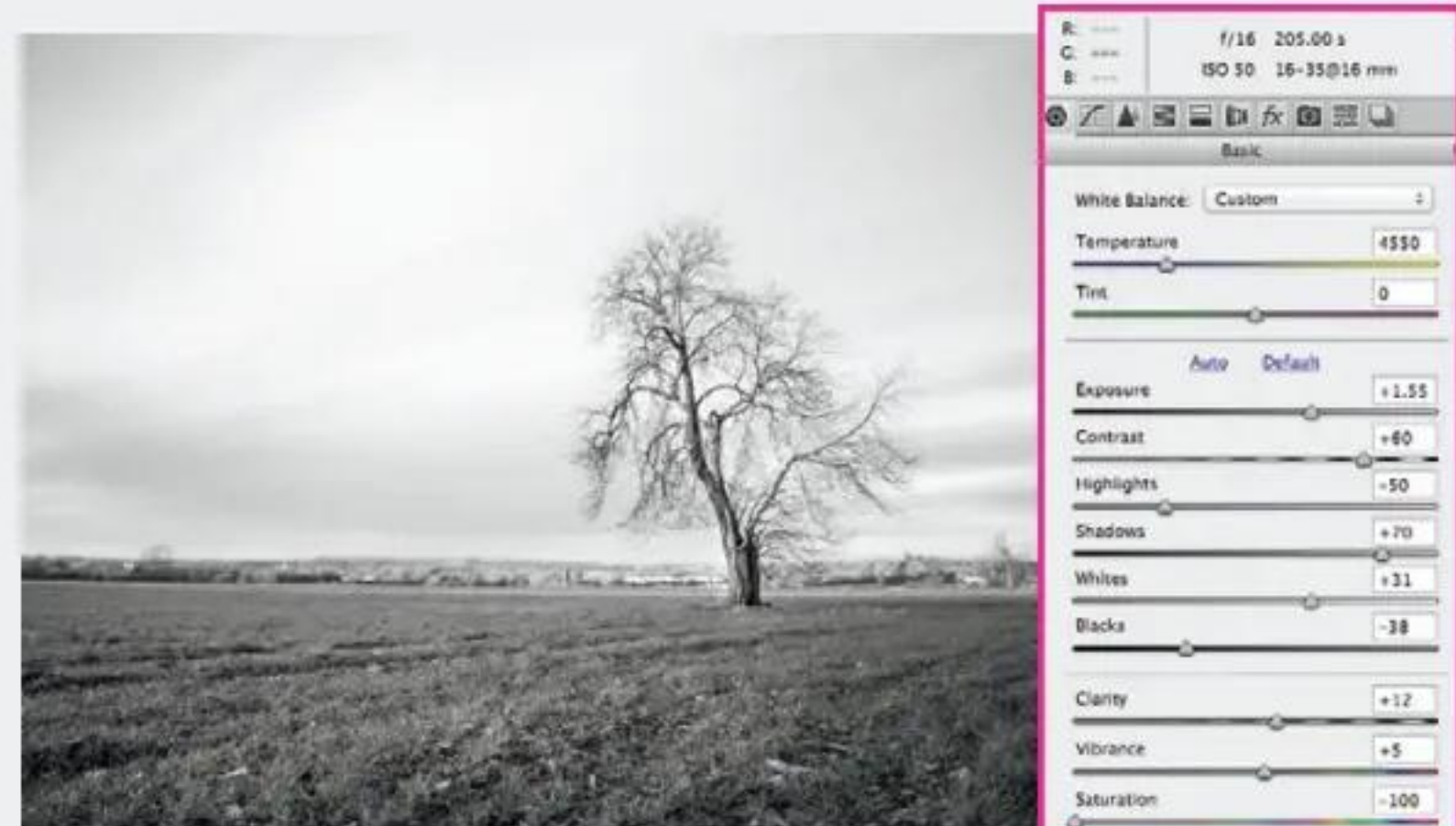
In Photoshop it's simple to control the amount of colour in your shots, and instead of a 100% black-and-white conversion, try desaturating portraits for a more artistic feel. Do this in Adobe Camera Raw, or with a Hue/Saturation adjustment layer in Photoshop.



04 TREAT YOURSELF TO A TINT

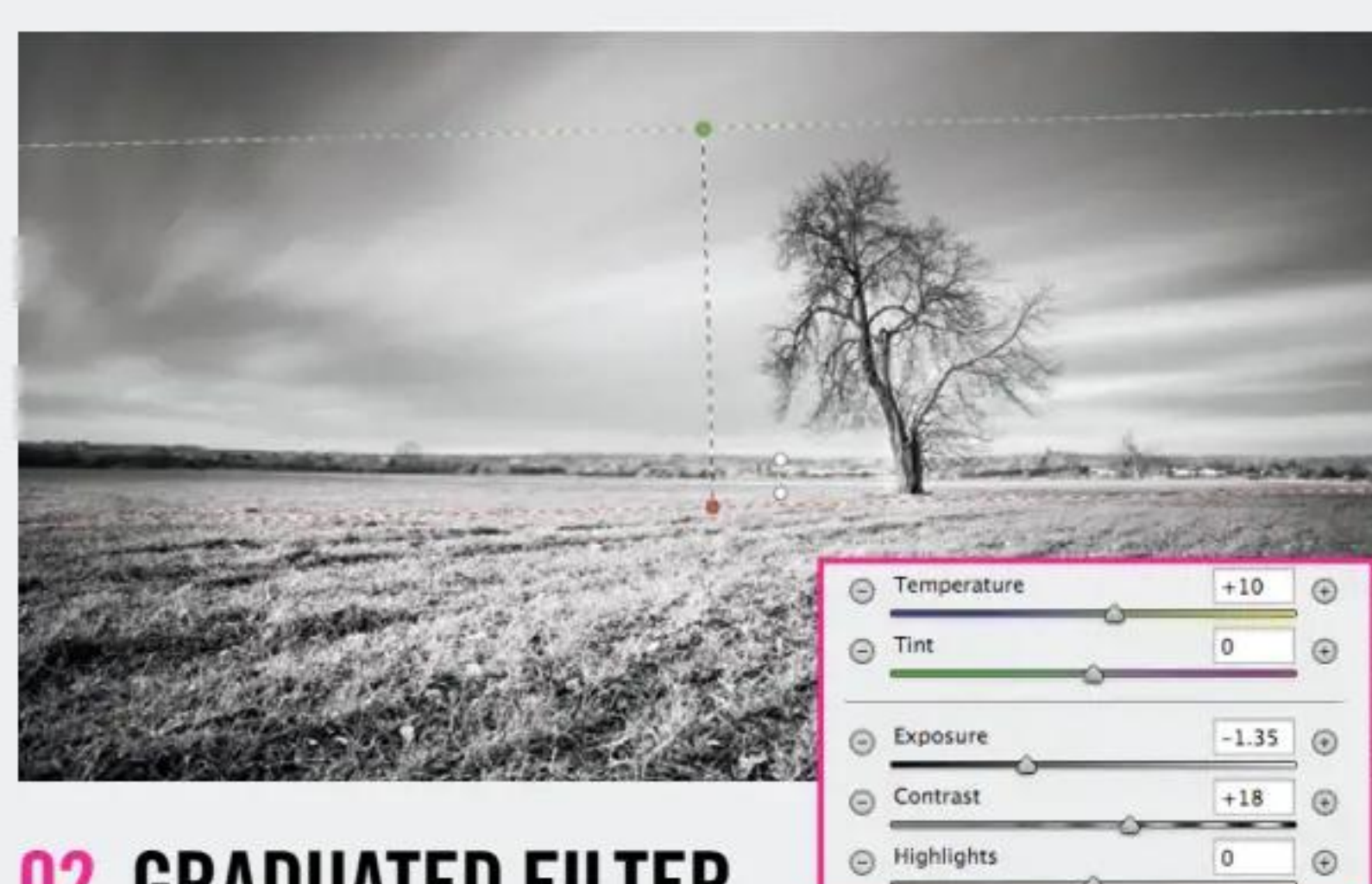
Add a tint to black-and-white portraits to give them an edge when creating monochrome conversions in Photoshop. Sepia and yellowy/orangey tints create a retro look, whereas the cooler blue tint we've used here gives the portrait a more modern, futuristic feel.

STEP BY STEP MEGA MONO CONVERSIONS IN ACR



01 RAW IMAGE B&W CONVERSION

In Adobe Camera Raw, we set Saturation to -100. We also boosted Exposure, Contrast, Shadows and Whites, and dropped Highlights and Blacks. Clarity was also increased.



02 GRADUATED FILTER

Apply two Graduated Filters: Exposure -1.35, Contrast +18 to darken the sky; and a 'thin' one at the horizon, Exposure +90, Contrast +47, Shadows +22 to lighten the land.

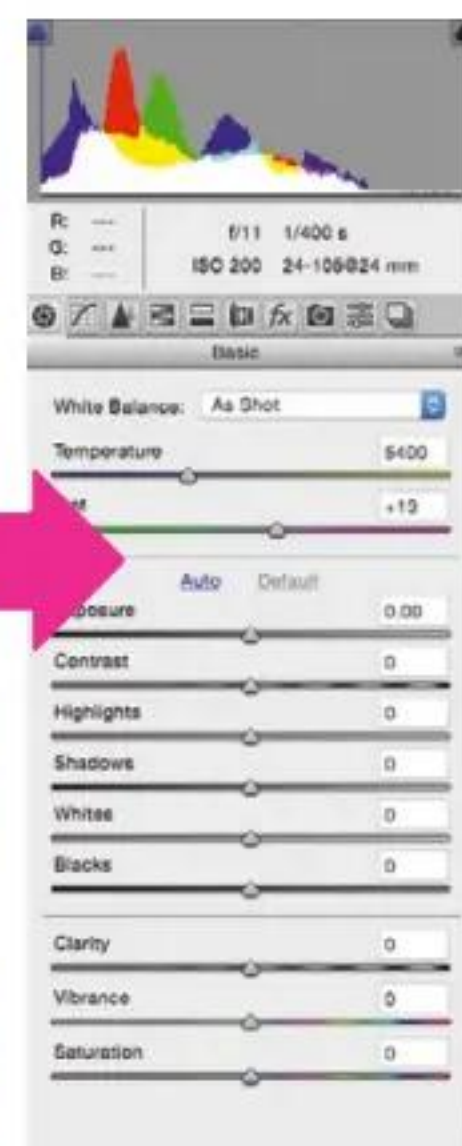


03 ADJUSTMENT BRUSH

Next, we used the Adjustment Brush and painted over the land beneath the tree and the tree itself, with Exposure +90, Contrast +47, to highlight these areas in the scene.

STEP BY STEP CONVERT RAWS FOR GREAT BLACK & WHITE

Take control of black-and-white conversions by using colour channels in Adobe Camera Raw



01 START WITH RAW

Open your colour Raw image in Adobe Camera Raw (in Photoshop CS/CC, not Elements). Scenic shots shot on sunny days with lots of contrast and bright blue skies are made for great black-and-white conversions. But this shot could do a good polish to realise its potential.



02 CONVERT TO GRAYSCALE

Click on the Grayscale/HSL tab, and click Convert to Grayscale. From here you can simply use the eight colour channel sliders to brighten and darken selected areas of your image. For example, we set Yellows to +30 and Greens to +50 to lighten the church and foliage.

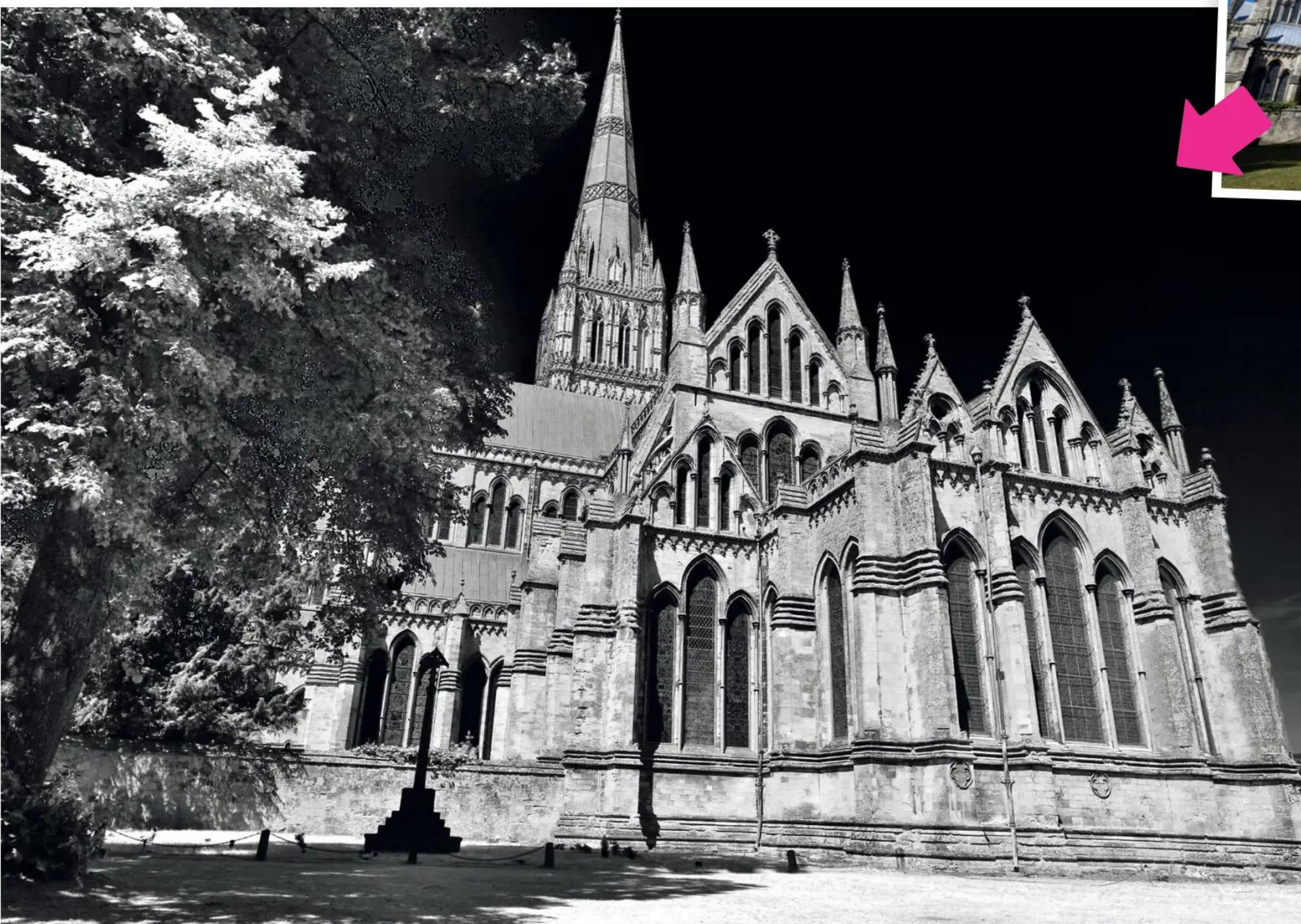


03 BOOST CONTRAST AND DETAIL

Back under the Basic tab, we've boosted Exposure and Shadows to lighten the image. We also increased Contrast and Whites, and decreased Blacks – all working to boost the contrast of different tones within the scene. Finally, Clarity is set to +10 to boost edge detail.

HOW TO CREATE THE B&W INFRARED LOOK

Take your black and whites to another level with an infrared-type effect



THE BEST black-and-white infrared shots are those with plenty of light and contrast, and a mix of vivid blue skies, buildings, foliage and grass, as all these elements can be enhanced separately for an out-of-this-world finish. Use Photoshop's Infrared preset when making a black-and-white conversion, then fine-tune the colour channel sliders to pinpoint areas you want to be lighter or darker, to help the focal points or subjects stand out in shot. It's a great excuse to push the boundaries, when processing images, as you can get away with much higher-contrast images, with bright white highlights and jet black shadows.



THE MISSION

Photograph birds of prey in flight at a bird sanctuary

Time needed

Two hours

Skill level

Intermediate

Kit needed

Telephoto lens
• Tripod

In-flight entertainment

Take your bird-of-prey photography to soaring new heights

A sharp photo of a swooping bird of prey is a real feather in the cap for any aspiring wildlife photographer. But birds in flight are among the most challenging animals to capture with your camera, and such is the reverence for the subject that the term even has its own acronym in wildlife circles – BIF.

As well as a stiff test of your camera gear and technique, the perfect shot relies on a fair degree of luck. But this is all part of the allure of bird photography, and

there are a few ways in which you can stack the odds in your favour.

The easiest way to get up close to birds of prey is at a sanctuary or zoo. We went to the wonderful Hawk Conservancy Trust in Hampshire for our avian shoot (www.hawk-conservancy.org). Places like this not only put on aerial displays to which photographers are more than welcome (there were lots of long, grey lenses on show during our visit) but many host specialist photography days and private sessions where you can work with

the falconers to get top shots of our feathered friends in flight.

When it comes to setting up your camera and choosing the right gear, there are plenty of techniques you can use, which we'll look at here. But success doesn't just rely on the best kit or a prime location; a knowledge of the subject is equally important. If you know where and when they are likely to appear, you can get into position for the perfect shot. We'll show you how to anticipate the action and capture bird behaviour at its best.



WINGING IT BIRD PHOTOGRAPHY BASICS

Improve your chances of capturing the perfect flight shot



01 EXPOSE CORRECTLY

Birds moving from bright sky to dark trees can play havoc with your metering. Use Manual mode so the exposure stays the same, even if the background changes.



02 TRACK THE SUBJECT

For solid panning, rather than twisting the shoulders, lock your elbows down then turn at the waist so your torso pivots as one. Or use a tripod and gimbal head.



03 FILL THE FRAME

Use a telephoto lens to fill the frame from a distance. A Canon EF 100-400mm f/4.5-5.6L IS II USM on a crop-sensor 60D gave us a focal length of 640mm.



04 SHARP SHOOTER

Fast-moving birds require responsive AF. The quicker the lens is at focusing and the more focus points your camera has, the greater your chances of sharp bird photos.

ESSENTIAL CAMERA SKILLS SET UP YOUR DSLR TO CAPTURE MOVING SUBJECTS



01 FAST SHUTTER

Moving subjects, long focal lengths and panning cameras mean that anything slower than 1/1000 sec is likely to result in motion blur, so set a fast shutter speed and increase ISO to compensate, if necessary.



02 BACK BUTTON FOCUS

Set back button focusing; keeping focusing and shutter separate means you can trigger autofocus with your thumb as you track your moving subject, then use your forefinger to press the shutter at the perfect moment.



03 AI SERVO MODE

AI Servo is Canon's predictive focusing mode. Not only will the camera's autofocus continually engage as long as the AF button is pressed, the subject movement will also be tracked and its next move anticipated.



04 HIGH DRIVE

A high-speed drive rate helps improve your chances of getting the perfect shot. The camera will fire continuously while the shutter button is held down, giving you a sequence of frames to choose from.



05 TRIPOD

Telephoto lenses can be difficult to handhold, and longer focal lengths increase chances of shake. A tripod will help. A gimbal head is ideal for following movement fluidly, but a video or pan/tilt head can be a good substitute.

TOP TIPS SIX WAYS TO CAPTURE BIRD BEHAVIOUR

Learn how to anticipate the action and find the best angle



PANNING FOR MOTION BLUR

If you're shooting the flight path side on, then you could try lowering the shutter speed and panning with the subject to blur the background. As a starting point, set a shutter speed of around 1/100 sec then try to keep the bird perfectly central in the frame as you shoot. It can be tricky, but get it right and the subject will be sharp while the background is blurred by the motion. It's also worth trying a slower shutter speed when straight on to blur the movement of wings, which adds a nice sense of motion to the shot.



01 WHERE'S THE WIND?

Birds of prey rely heavily on the direction of the wind for flight. They're happier flying into the wind as this gives them the uplift they need to keep steady. Position yourself upwind to capture them head-on.



02 TAKE-OFF AND LANDING

A moment before bigger birds land they spread their wings and softly swoop to the ground, which is a good time to try and capture them. Again, the wind plays a part as they prefer to take off and land into the breeze.



03 BIRD PORTRAITURE

At sanctuaries and zoos birds can be photographed when perched. Approach this as you would a typical portrait. Focus on the eyes and shoot wide open, and the background will slip into beautiful blur.



04 PRE-FOCUS ON A SPOT

If you can anticipate where the bird is likely to swoop (such as for food in the falconer's hand or a fish in a pond) try composing and pre-focusing on that spot, then shoot continuously as they enter the frame.



05 INCLUDE THE SURROUNDINGS

When composing a shot, think about the background. A plain sky can look bland, so try to shift your angle to include land or trees; a hint of the surroundings adds context to the shot and helps to ground the subject.



06 LIGHTING

Sunlight from behind works particularly well during take-off, as it filters through the bird's wings for a beautiful backlit effect. And a low sun can add warmth to the scene for a more atmospheric shot.

ESSENTIAL LENS SKILLS SET UP YOUR TELEPHOTO

There's more to telephoto zooms and primes than just a long reach...



01 ENGAGE THE FOCUS LIMITER

Most super-telephoto zoom lenses have a focus limiter switch, like this, on the barrel that will lock off the closest part of the range. This helps to prevent 'hunting' while focusing on a distant subject. So if you know your subject isn't going to get close, limit the focus range.



02 SET UP STABILIZATION

Some lenses have two or three IS modes. Mode 1 is for standard stabilization in all axis, while Mode 2 detects the panning motion of the camera and doesn't correct stabilisation in the direction of movement, so is better for birds in flight. Mode 3 only engages stabilisation during exposure.



03 USE THE HOOD

A lens hood is a must when you're pointing your camera skyward, as it keeps the front element shaded to prevent flare fogging your shot. Some newer hoods, like the one on our Canon 100-400mm lens, have a handy side window through which you can adjust filters without removing the hood.

COMMON MISTAKES DON'T BE A BIRD-BRAIN

Some of the biggest pitfalls of bird photography – and how to avoid them



CROPPED FEATHERS

When framing your shot, it can be tricky to judge the wingspan of the bird in flight, so take extra care not to crop off any outstretched feathers.



FOCUS JUMPING

Watch that your focus doesn't accidentally jump onto the background, rather than the subject. Setting your camera to AF Point Expansion can help prevent this.



UNDEREXPOSURE

A small subject on a bright background will fool your camera into underexposing. To expose for the bird, dial in exposure compensation or use Manual mode.



BACKGROUND CAGES

Watch out for cages, sheds and signs of enclosure while tracking birds in flight – your composition will usually be better off without them.



DOF TOO SHALLOW

A shallow depth of field might result in a sharp tail but soft eyes, so consider sacrificing a stop of ISO for a higher f-number to increase depth of field.



OUT-OF-FOCUS

A few soft shots are inevitable, but you can increase your chances with the right autofocus settings, a high drive rate and plenty of perseverance.



THE MISSION

Cast interesting shadows over your portraits with gobo lighting techniques

Time needed
One hour

Skill level
Intermediate

Kit needed
Light source, such as Speedlite, studio head or bare bulb
• Wireless trigger

Out of the shadows

James Paterson shows you how to add drama to portraits with a gobo

A ‘gobo’ is a term that originated in the film industry, where lighting plays a huge part in creating a mood to match the unfolding drama.

It’s used to describe anything that ‘goes between’ the light source and the subject or background that creates a pattern of shadows. As such, gobos come in all kinds of shapes and sizes. There are natural gobos – think of the sun shining through leaves, creating a pattern of shadows underneath.

Then there are the kind of gobos that we create ourselves to change the mood of our scene. A classic example is the film noir look we’ve evoked here, where a blind between the light and subject creates stark horizontal shadows.

We’ll look at a variety of gobo lighting techniques you can use to add depth and drama to your portraits. Your light source can be anything you like – we used a Speedlite and a studio flash head – but any light will do, as long as it’s from a small source, like a bare

bulb. If the light source is too big, then the shadows will become soft-edged and the patterns less defined. So the source needs to be small and hard. Think of direct sunlight – it comes from a small source (okay, the sun is huge, but it’s a long way away!) so the light it produces is very hard-edged and contrasty. In fact, if it’s a bright day, you could use the sunlight spilling through the window. And if you’re happy to ramp up your ISO a little, you can even get away with using household lamps.

LIGHTING SETUP THE FILM NOIR LOOK

Here are a few things to consider when setting up your gobo lighting

01 GOBO

So-called because it 'goes between' the light source and the subject, a gobo can be anything that casts an interesting shadow. We hung the blind in a doorway then positioned the light on the other side to create horizontal stripes across the wall.

02 LIGHT SOURCE

Keep the light source as small as possible for hard shadows. We fired one Speedlite (seen here fitted with a wireless trigger) through the blind, with a second flash opposite the model, fitted with a grid to control the spread.

03 DISTANCE

Small light sources create hard shadows, which is important if you want clearly defined patterns of light. Distance also plays a part; the further the light is from the gobo, the smaller it is in relation to the subject, and the harder the shadows.



04 REFLECTOR

If the main light source is behind your subject, then a reflector comes in handy. It acts almost like another light source, bouncing light back into the shadows, and is useful if shooting in sunlight, as the bounced light helps even out contrast.

05 POSING

It can be tricky to judge how shadows will fall across your subject, especially if using flash. So take plenty of shots and ask your subject to move one way or another between frames. Even tiny movements have a big impact on the way the light falls.

06 CAMERA SETUP

Set your camera to Manual mode. Use ISO100 and set the shutter speed to your max sync speed (usually 1/200 or 1/250 sec) then take a test shot. Adjust either the aperture or flash power/distance until you get the effect you're after.

PROJECTS



SETUP 1 SUN HAT

A sun hat can make a fantastic dappled pattern across the face. Position the light source directly above the head, as high up as possible. Or alternatively, if it's a cloudless day, head outside and use direct sunlight. We used a studio flash head here. A reflector placed directly underneath the chin will help to lift the shadows and lower the contrast by bouncing some of the harsh light back up into the face. Ideally, you'll want both eyes to be in patches of light. Ask your subject to move the head very slightly between shots until you nail it.

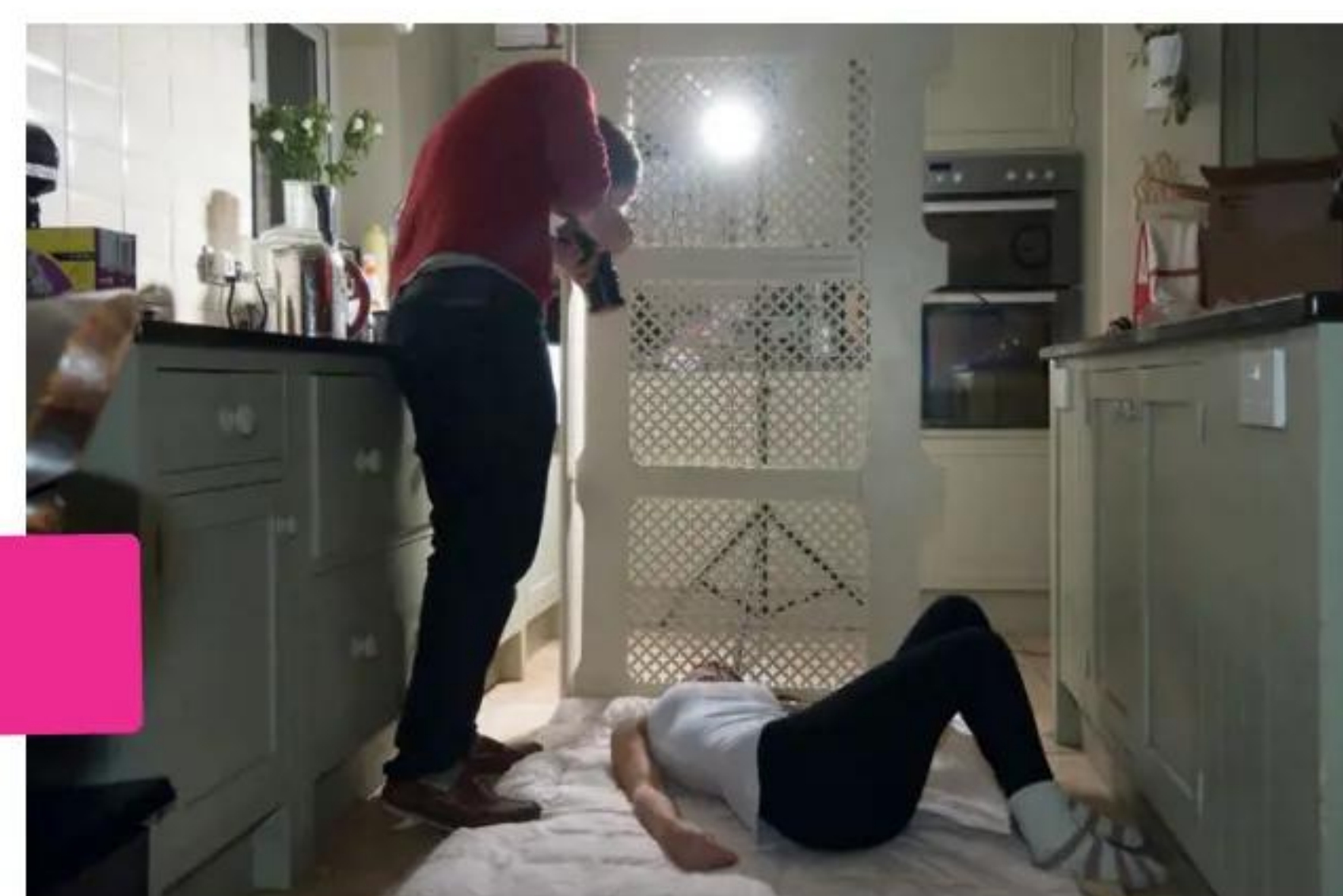
Exposure: 1/200 sec, f/5.6, ISO100



SETUP 2 SCREEN

Look around the home and you're likely to find plenty of objects that will create interesting shadows. Here a radiator cover makes a dappled light effect. Shot from above with the model lying on her back, it suggests morning sunlight breaking through a nearby window. Gobo lighting is often perfect for a black-and-white treatment. Monochrome is a great simplifier, and with this type of lighting there's always a danger that the frame will start to look too busy. Stripping out the colour not only emphasises the patterns and shapes, but also gives your portraits a classic, timeless feel.

Exposure: 1/160 sec, f/4, ISO100

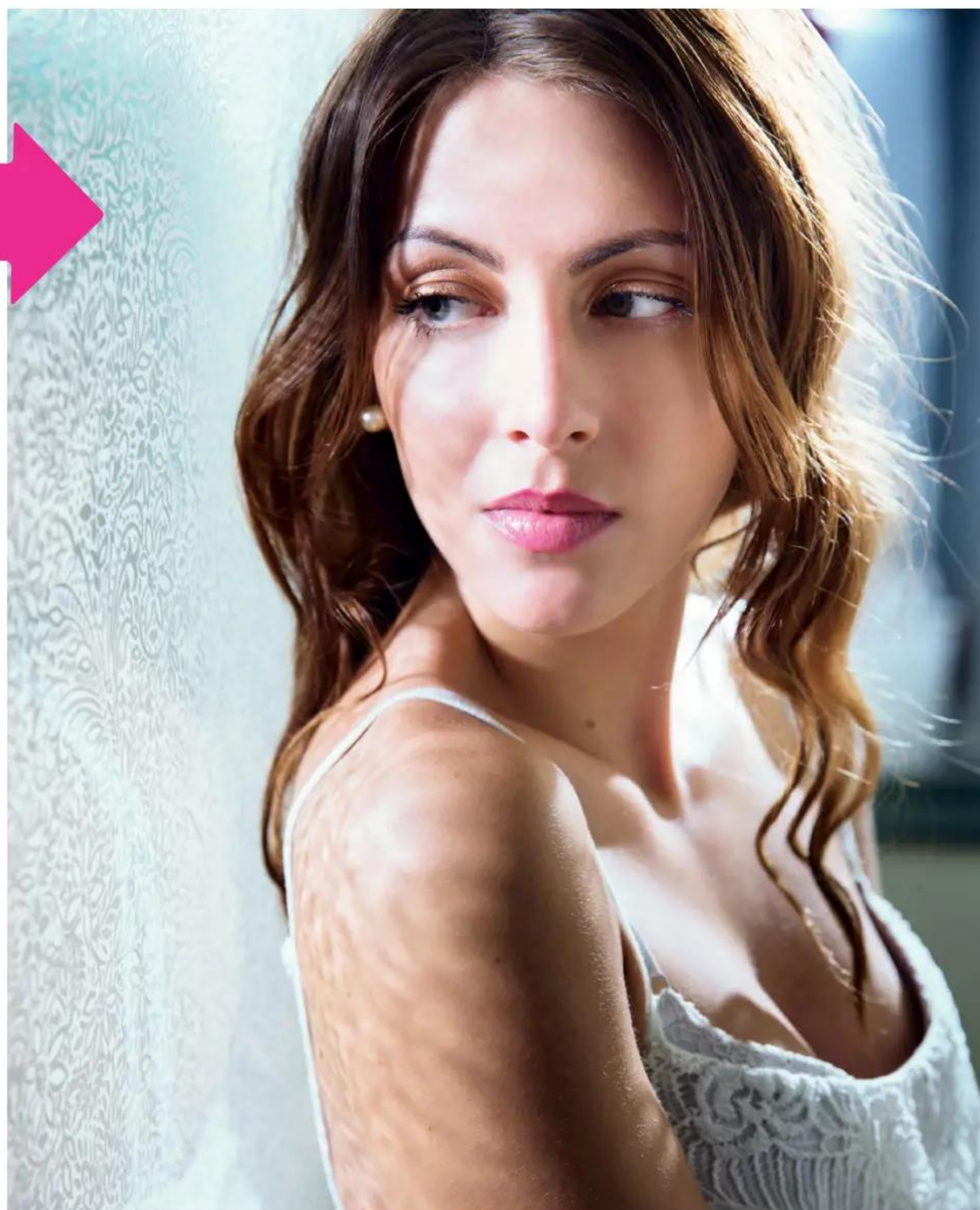




SETUP 3 WINDOW

Often windows will have a patterned effect that can be used to cast interesting shadows. Here the panel from an interior door creates patches of light over the face and shoulder. We positioned a second light in the doorway to light the subject from behind, creating the backlit effect you can see in the main image. Notice, too, how the pattern of shadows falls away – it's stronger on the shoulder than over the face, which is marginally further away from the window. So, if you want strong, well-defined patterns, position your subject closer to the gobo.

Exposure: 1/160 sec, f/4.5, ISO100



SPEEDLITE MODEL LIGHT

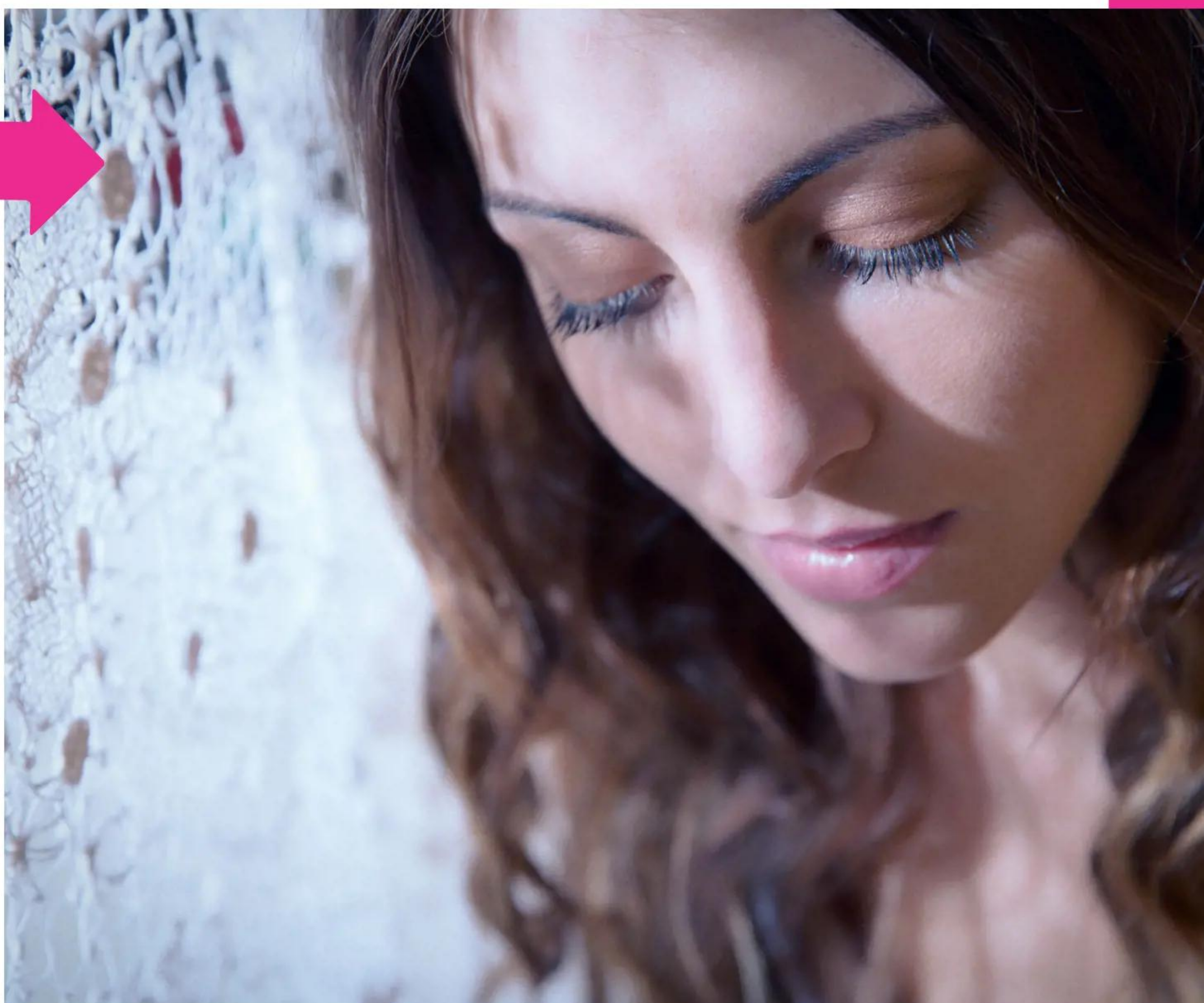
If you're using a Speedlite it can be tricky to see how the shadows will fall as, unlike studio heads, they don't have a continuous modelling light. However, some Canon Speedlites, like the 600EX-RT, have a handy temporary modelling light that fires for one second when you hold the Test button down. You can enable the feature in the menu (C.Fn 2). To avoid damaging the flash by overheating, do not fire the modelling flash more than ten times continuously – and after firing it ten times in a row, allow it to rest for at least ten minutes.



SETUP 4 LACE

Lace or other materials with similar patterned transparency can cast beautiful shadows. Shooting side-on like this will allow you to include the material in the frame, although it can lead to harsh lighting across the face. Look to position the light so that the shadow cast by the nose creates a triangular patch of light on the cheek. This is sometimes called Rembrandt lighting, after the master painter. For a moody shot of the subject's eyelashes like this, lower the flash power and open up the aperture for a shallow depth of field, so that everything but the lashes is thrown out-of-focus.

Exposure: 1/160 sec, f/4.5, ISO100



GearTest



Canon EOS R system cameras	174
Canon EOS R5 Mark II	186
Canon EOS R1	194
HÄHNEL Modus 600RT Wireless Kit	202
Photo backpacks	204
Sturdy tripods	206

194





174



206



202

THE CONTENDERS APS-C



Canon EOS R100
£559/\$599



Canon EOS R50
£789/\$799



Canon EOS R10
£999/\$979



Canon EOS R7
£1349/\$1499

THE CONTENDERS FULL-FRAME



Canon EOS R8
£1699/\$1499



Canon EOS R6
Mark II
£2779/\$1999



Canon EOS R5
Mark II
£4499/\$4299



Canon EOS R3
£5499/\$4999



CANON EOS R SYSTEM CAMERAS

Canon's range of EOS R System cameras has reached full maturity, but out of all the current options, which is your best fit?

The original EOS R changed everything when it launched back in 2018. It plundered 30 years of EOS heritage and shoehorned it into a game-changing mirrorless full-frame body. Not only that, but companion RF lenses set new benchmarks for image quality and all-round performance. And while RF lenses were thin on the ground to start with, mount adaptors ensured compatibility with Canon's back catalogue of EF and EF-S lenses. Indeed, unlike with full-frame DSLRs, you can use EF-S lenses on full-frame EOS R System bodies in crop mode, giving yet more options for compact, lightweight shooting. And speaking of compact, the delightfully diminutive EOS RP launched months later.

Let's jump in the time machine and fast forward to 2025. There are currently a lucky 13 different EOS R camera bodies on the market, available either new or used, and a very healthy collection of RF lenses to choose from. While EOS DSLRs, EF and EF-S lenses are being phased out, new RF and RF-S lenses are ramping up, so there's literally something for everybody.

The only downside is that we're now a bit spoilt for choice and it can be hard to choose the EOS R System camera that's the best fit for your needs. To some extent, your perfect EOS partner depends on what kinds of photography you're into, and your level of expertise. 'Hybrid' has definitely become a buzzword in the camera market so, for some, video specs can be just as important as stills performance. Naturally, budget is often the bottom line, and nobody wants to spend more than they need to. Let's take a look at how each and every one of these EOS R System cameras compares.





CANON EOS R100

£559/\$599

Priced for beginners taking their first photographic steps, this entry-level camera keeps things simple

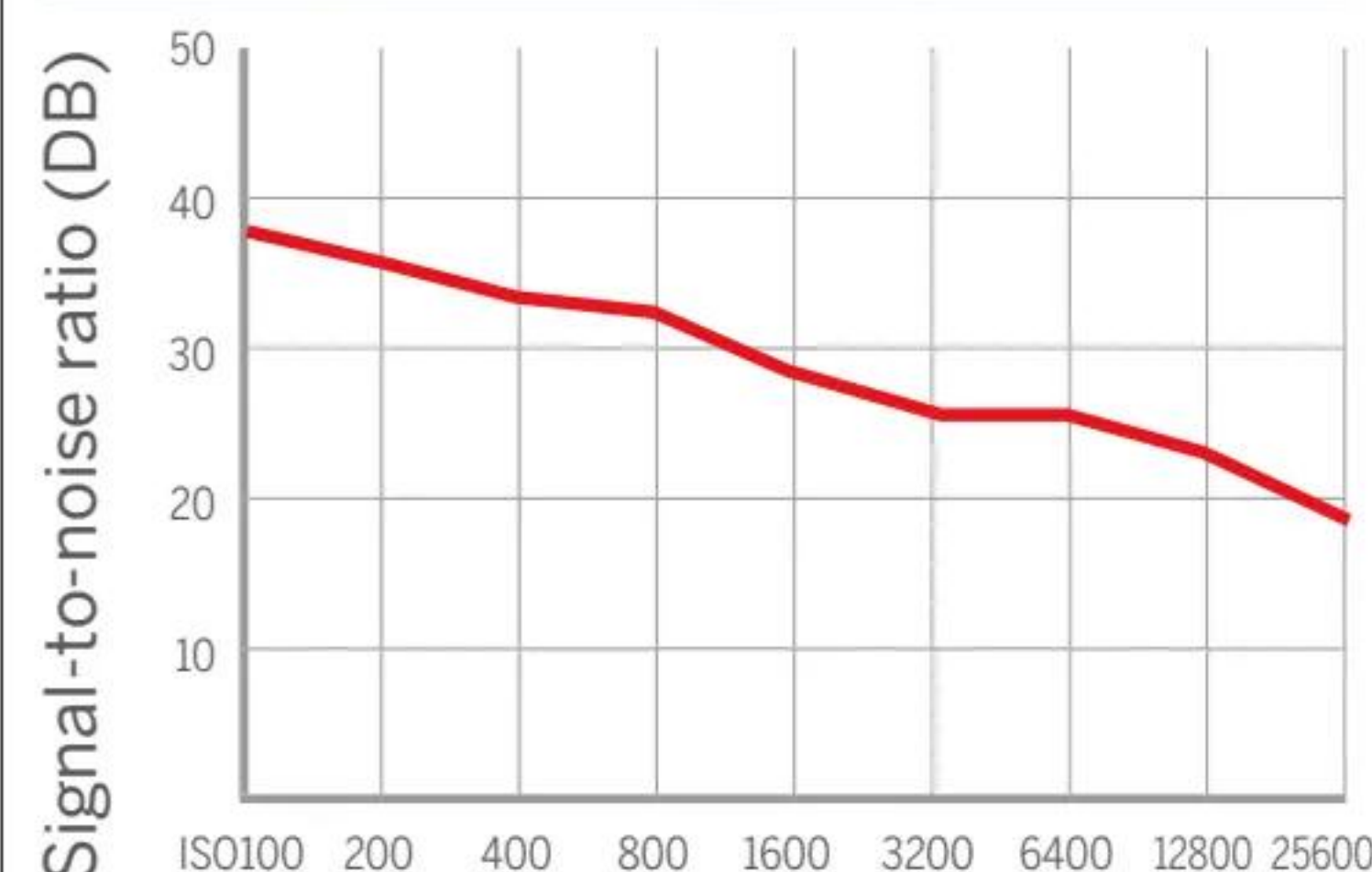
The price of this camera is cut to the bone, aiming to entice photographers and content creators wanting to shift up a gear from a smartphone. As such, it's an R System replacement for the likes of the entry-level EOS 2000D and EOS Rebel T7 DSLR.

It's very compact, having exactly the same dimensions as the EOS R50, and is even lighter in weight at just 356g. We've quoted the 'body-only' price here, but beginners are more likely to go for the complete kit, with an RF 18-45mm zoom lens.

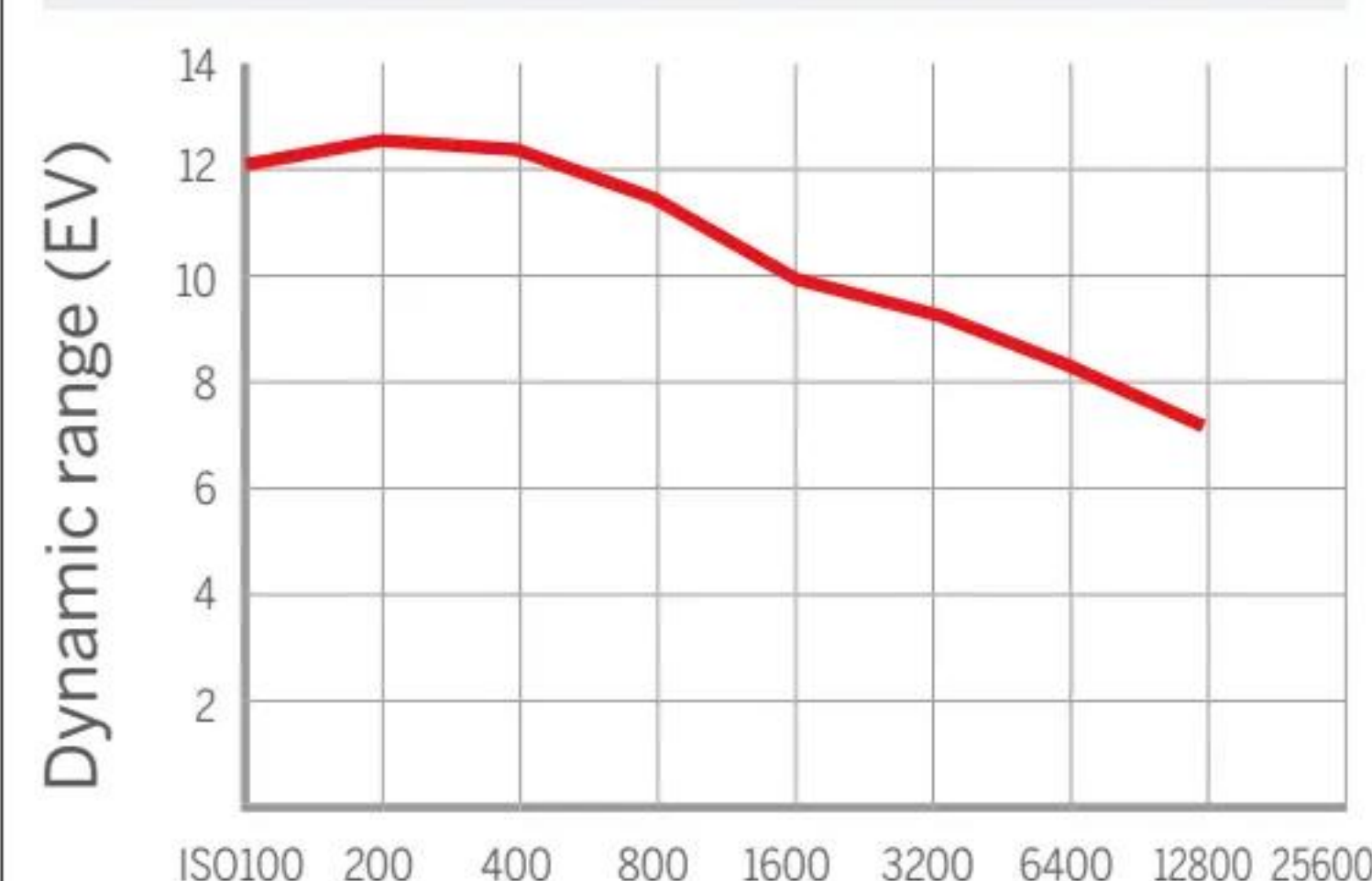
With an older-generation DIGIC 8-image processor, the EOS R100 is also the only camera in the main test group to lack Dual Pixel CMOS II, deep-learned AI autofocus. As with the original EOS R and RP, it can 'recognise' humans, but not animals and vehicles. It's also the only camera in the group to lack a Vari-Angle touchscreen, and the fixed LCD isn't actually a touchscreen at all.

As a plus, the camera is on a level footing with most others on test for stills resolution with a 24.1MP sensor, and can capture 4K

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



The R100 is good at low ISO settings, but less so at the upper end of the somewhat restricted sensitivity range

UHD video at 30/25/24p. That said, you can't shoot video in HDR mode and there's no support for 10-bit HEIF stills, unlike all other recent EOS R System cameras.

Performance

Although the feature set lacks finery, the bottom line is that the R100 is a very beginner-friendly camera, capable of taking beautiful still images and good video. It's not exactly sporty though, as the continuous burst rate of 6.5fps drops to just 3.5fps in Servo (continuous) autofocus mode.

FEATURES

- 01** The image processor and autofocus system are a step behind other cameras on test
- 02** Control dials and buttons are basic but beginner-friendly
- 03** No touchscreen or Vari-Angle versatility
- 04** The mode dial includes access to scene modes and filter effects
- 05** The 0.39" OLED, 2360k-dot viewfinder matches other APS-C format R System cameras

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

OVERALL

★★★★★

HOW WE TEST

We combine real-world shooting results with rigorous lab testing to arrive at our overall ratings



For real-world results, we test cameras with a selection of lenses, in wide-ranging shooting conditions, from bright sunshine and dull outdoor conditions, to interior lighting and night shots. We particularly focus on the accuracy and consistency of autofocus and metering systems, auto white balance and all other shooting parameters. All aspects of image quality are checked. We also judge cameras for their handling characteristics, ease of use and how well the menu systems work, including factors like the intuitiveness of touchscreens and Vari-Angle screens. We also run a series of lab tests on cameras, enabling us to give quantifiable results for various attributes of image quality. These include signal-to-noise ratio, dynamic range, and the ability to resolve fine detail. All of these facets are measured in raw quality mode, at one-stop increments throughout each camera's sensitivity range.



CANON EOS R50

£789/\$799

A clever little APS-C mirrorless camera that's able to grow with beginners as you learn new skills

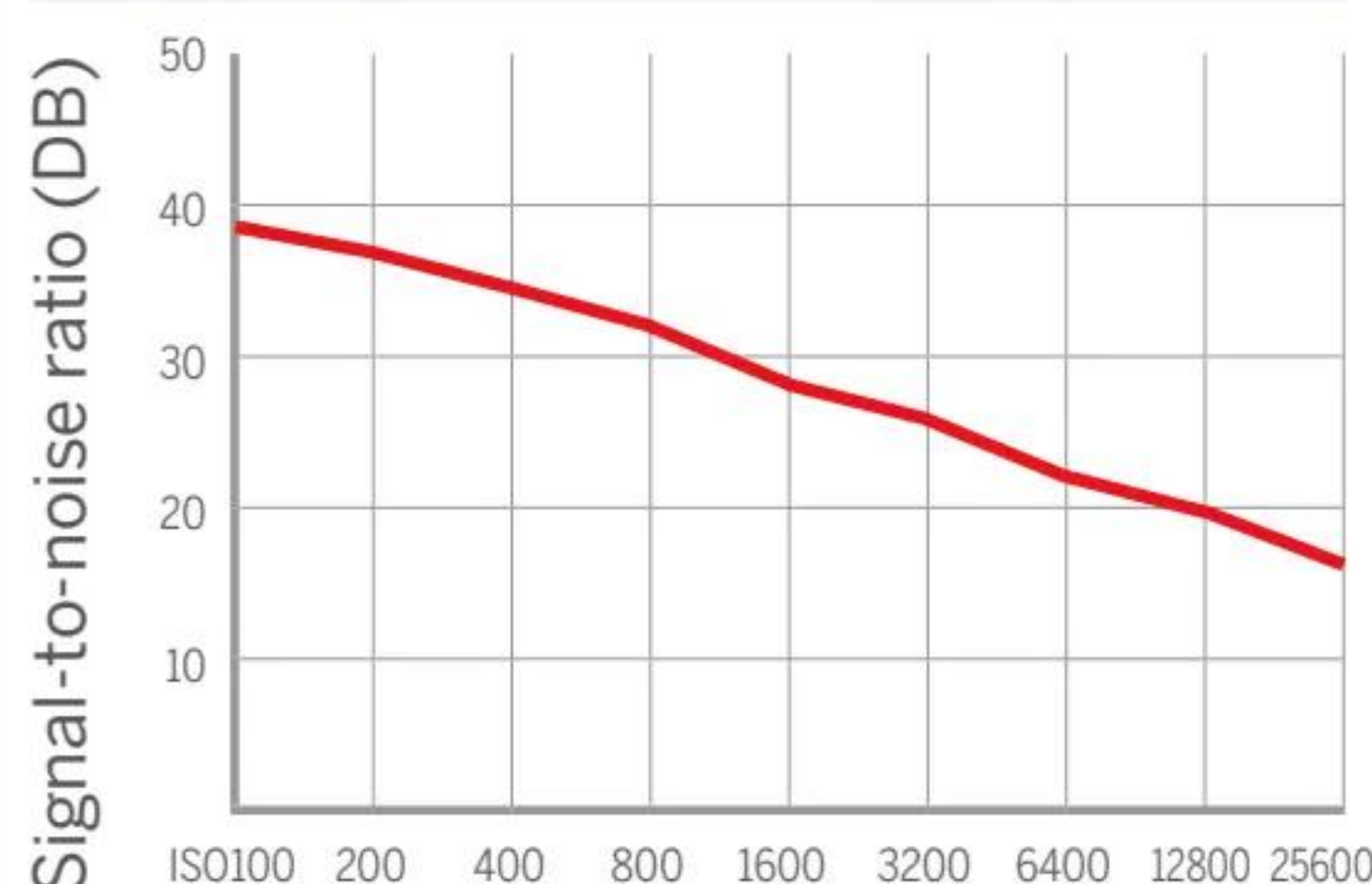
The EOS R50 is pricier than the R100 but has a lot more going for it. Next to the more basic model, it has a newer 24.2MP Dual Pixel CMOS II sensor and DIGIC X image processor, complete with deep-learned AI autofocus. As with more expensive EOS R System cameras, it has recognition and tracking for humans (eyes, face, head, body), animals (dogs, cats, birds) and vehicles (racing cars and bikes).

Also unlike the EOS R100, the R50 gives you the option of shooting with a fully electronic

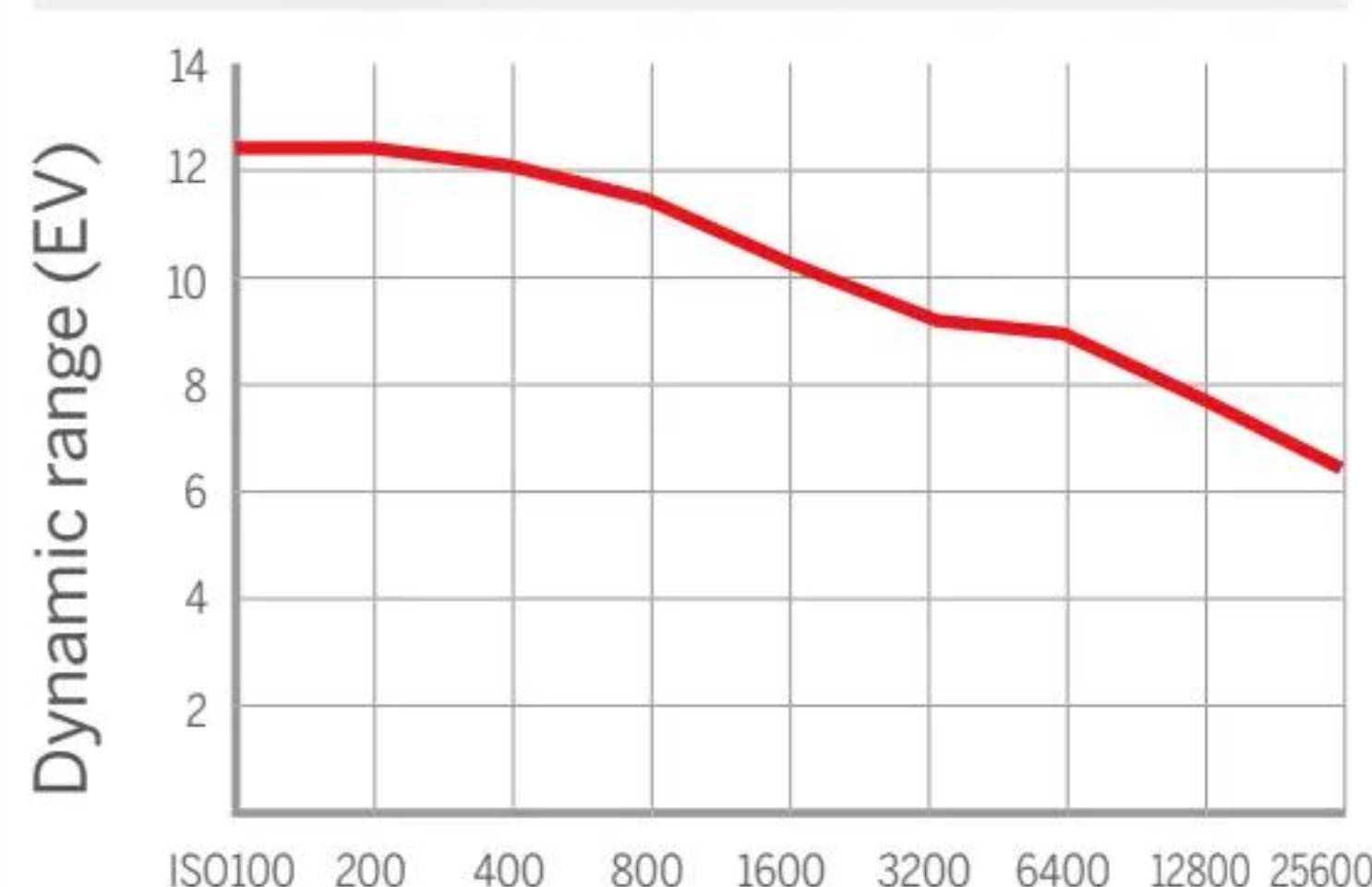
shutter, doubling the maximum shutter speed from 1/4000 to 1/8000 sec for freezing even really rapid movement. The maximum burst rate jumps up to 12fps or 15fps in mechanical (electronic first curtain) or fully electronic shutter modes respectively, though the RAW buffer depth is a mere seven shots, so be careful with timing when shooting bursts.

At the back, there's a higher-res 1620k-dot LCD and here it's the more usual Vari-Angle touchscreen. Again, the R50 delivers 4K 30/25/24p UHD video but with a

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



Dynamic range is good for an APS-C format camera but the R50 is typically noisy at high ISO settings

10-bit HDR option, and 10-bit frame grabs in HEIF stills format.

Performance

The R50 has an almost identical control layout as the R100, but adds a dedicated ISO button just next to the shutter button. The touchscreen also makes it easier to navigate menus to adjust key shooting parameters. At low to medium ISO settings, image quality is great for both stills and movies, making the R50 a very compact camera that genuinely punches above its weight.

FEATURES

- 01** The separate ISO button allows for an AF/MF function on the multi-way pad
- 02** Has a Vari-Angle touchscreen like others in the group
- 03** As per the R10/R7, the sensitivity range is ISO100-32,000
- 04** Has UHS-I not UHS-II, which means slightly slower SD card data transfer speeds
- 05** Image formats for stills include 14-bit RAW, C-Raw (compressed), 8-bit JPEG and 10-bit HEIF

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

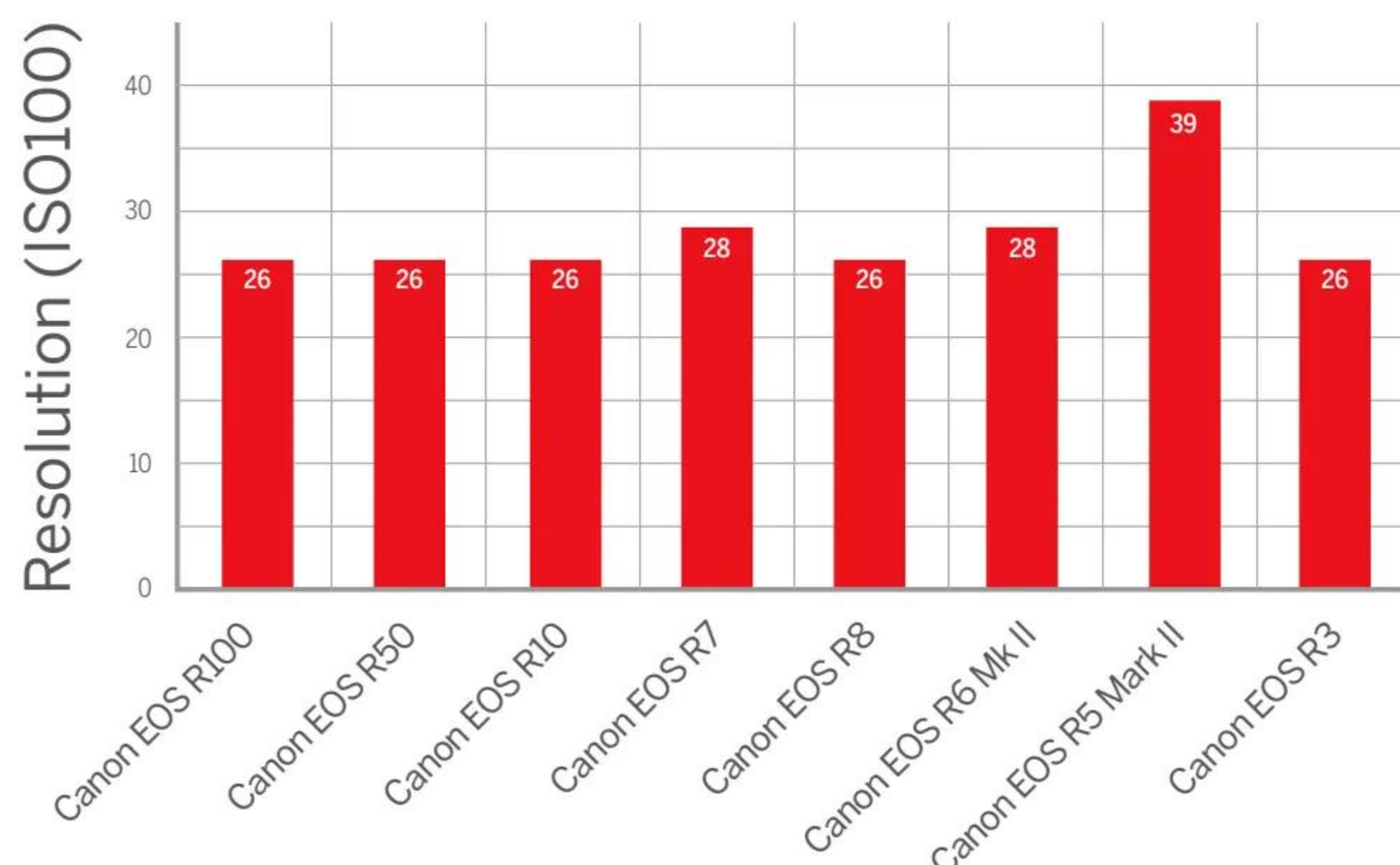
OVERALL

★★★★★

RESOLUTION

It's no surprise there's an outright winner in this group for resolving fine detail

When it comes to resolving ultra-fine detail and texture within images, the 45MP image sensor of the EOS R5 Mark II pays dividends. The relatively high megapixel count enables the camera to truly make the most of the inherent sharpness of Canon's very best RF lenses. Most of the other cameras on test have a very similar megapixel count of just over 24MP, but the R6 Mark II takes second place overall, matching the 32.5MP APS-C format R7 through most of the sensitivity range and edging ahead at the very highest ISO settings.



APS-C



CANON EOS R10

£999/\$979

Small but fast and powerful, this camera rewrote the APS-C format mirrorless rule book

Almost as small and light as the EOS R100 and R50, the R10 is particularly travel-friendly and versatile. Its new 24.2MP APS-C format image sensor really bumped up data output speeds. The result is super-fast drive rates of 15fps, rising to 23fps in electronic shutter mode. The latter also boosts max shutter speed to 1/16,000 sec.

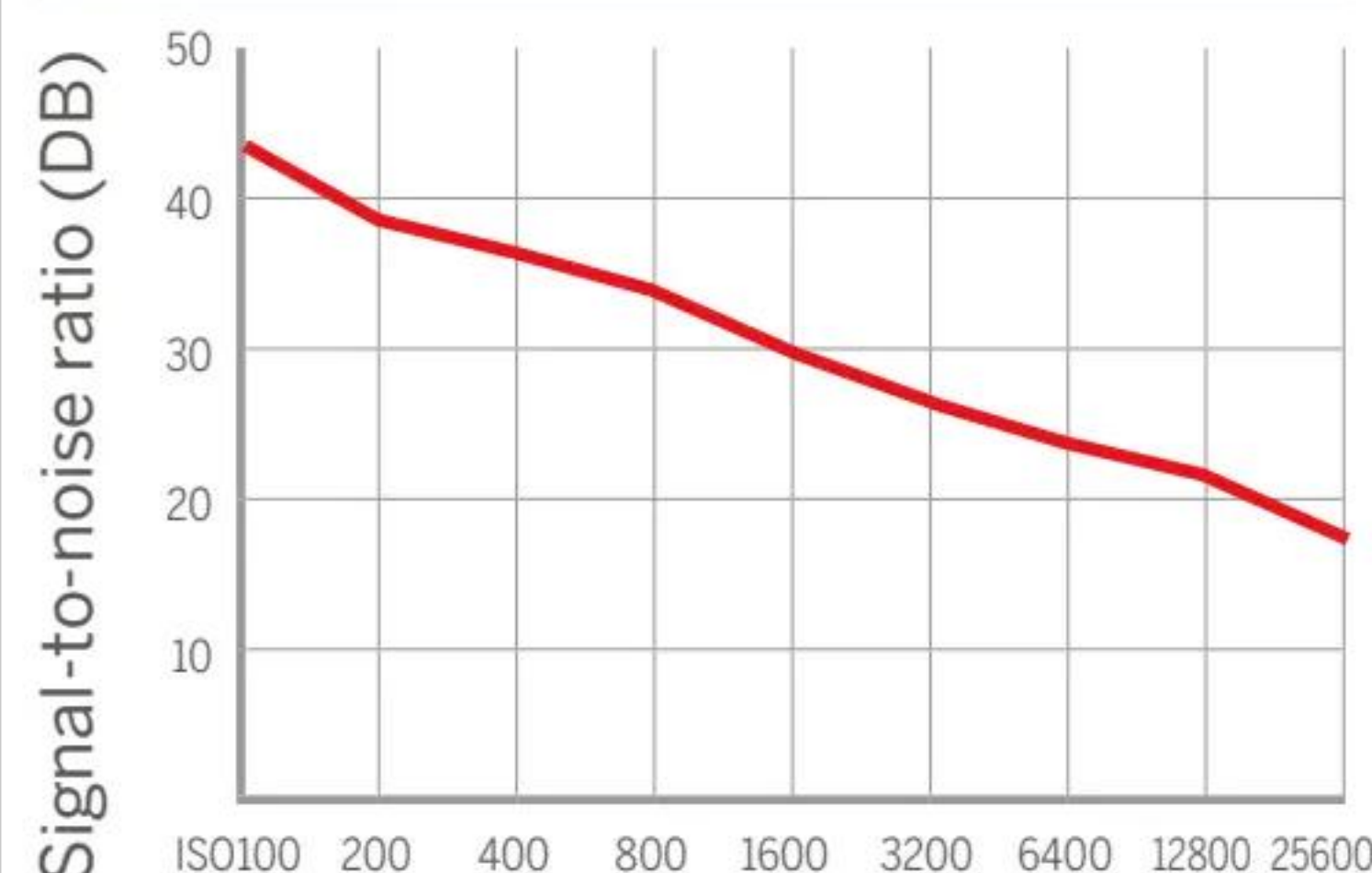
Better still, the budget-friendly R10 inherited the same Dual Pixel CMOS AF II autofocus system that's featured in the R3, R5 and R6, with deep-learned AI tracking

for people, animals and vehicles. The camera can also capture 4K movie footage, although top-end 60p/50p comes with a crop mode.

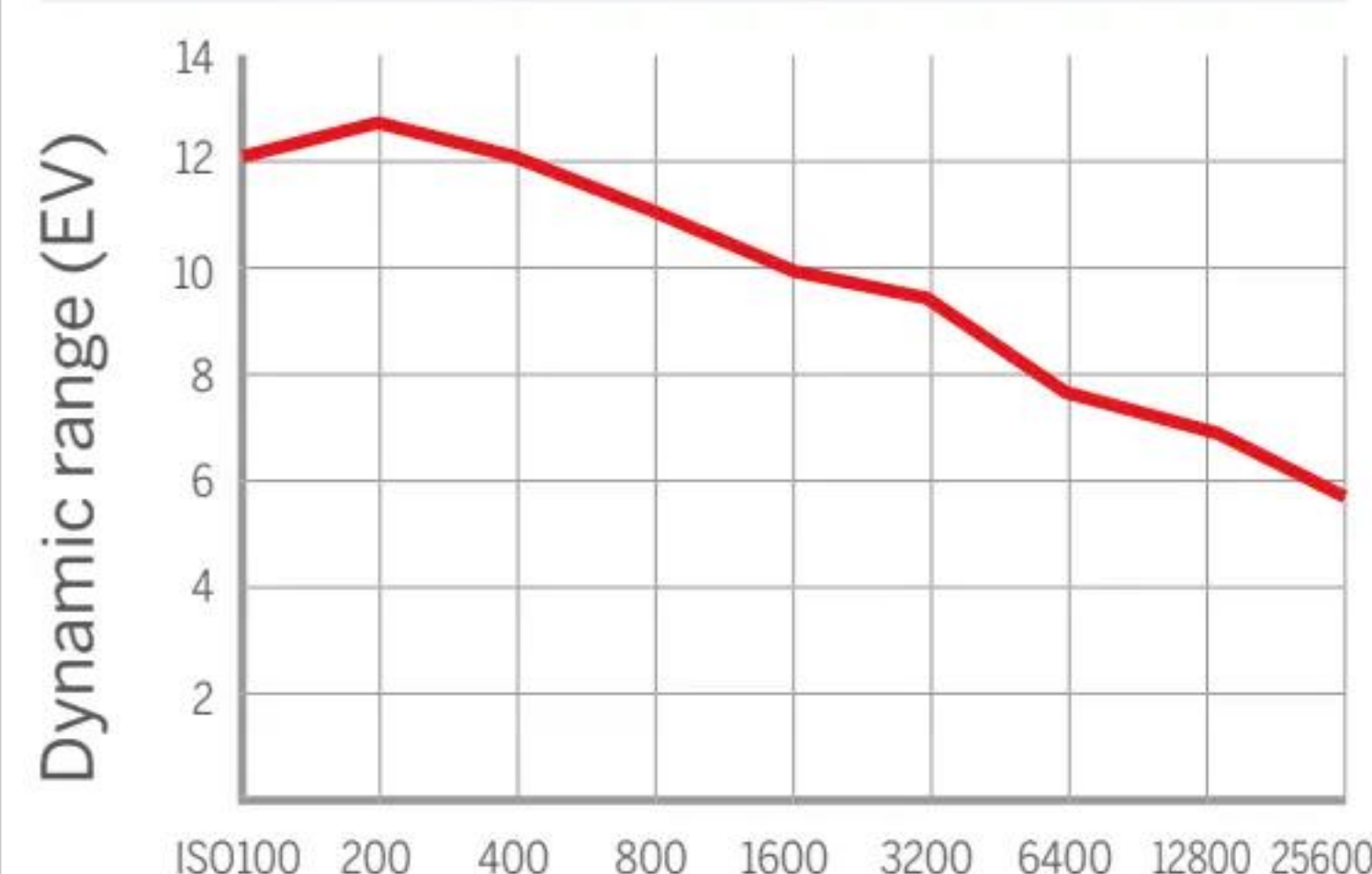
Not much bigger than some of Canon's EOS M system mirrorless cameras, the R10 nevertheless packs a mic socket, Vari-Angle touchscreen and even a pop-up flash. However, as with the EOS R100 and R50, there's no in-body image stabilizer nor weather-seals.

The viewfinder gives a 0.95x magnification factor and the typical 100 per cent frame coverage of mirrorless cameras,

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



The R10 edges ahead of the newer R100 and R50 for signal-to-noise, but not for dynamic range

along with a well-detailed 2360k dot display. The downsized design means the relatively small LP-E17 battery only covers 260 viewfinder-based shots, although 430 shots are available for screen-based shooting.

Performance

Speed and accuracy in drive rate and autofocus are incredible for a camera aimed at the beginner and intermediate market. Image quality is great in all respects, not least as the RF mount gives access to Canon's full range of superb range of RF lenses.

FEATURES

- 01 Controls include an M-fn button and AF-MF switch
- 02 Unlike Canon's full-frame mirrorless cameras, it features a pop-up flash
- 03 Rear-side controls include an AF-On button and joystick
- 04 The Vari-Angle touchscreen isn't as high res as the R50s, with 1040k (not 1620k) dots
- 05 Only room for a slimline LP-E17 battery; you'll need to pack a spare

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

OVERALL

★★★★★

CANON EOS RP £1049/\$899

It's certainly slim for a full-frame camera, but feels a little lacking in features

With the same full-frame image sensor and similar core features, the EOS RP is very much the newer, mirrorless version of the EOS 6D Mark II DSLR, and it's a whole 280g lighter in weight. The electronic viewfinder is good but not exceptional and there's no IBIS. The burst rate of 5fps is slower than in the

6D Mk II and drops to 4fps with continuous autofocus. Autofocus itself is quick and accurate, but it lacks the advanced 'deep-learned AI' subject tracking AF of almost all next-generation R System cameras. 4K video comes with a severe crop factor and a lack of Dual Pixel AF.

★★★★★



APS-C



CANON EOS R7

£1349/\$1499

A mirrorless replacement for the speedy but obsolete EOS 7D Mark II DSLR, with extra mirrorless fire-power

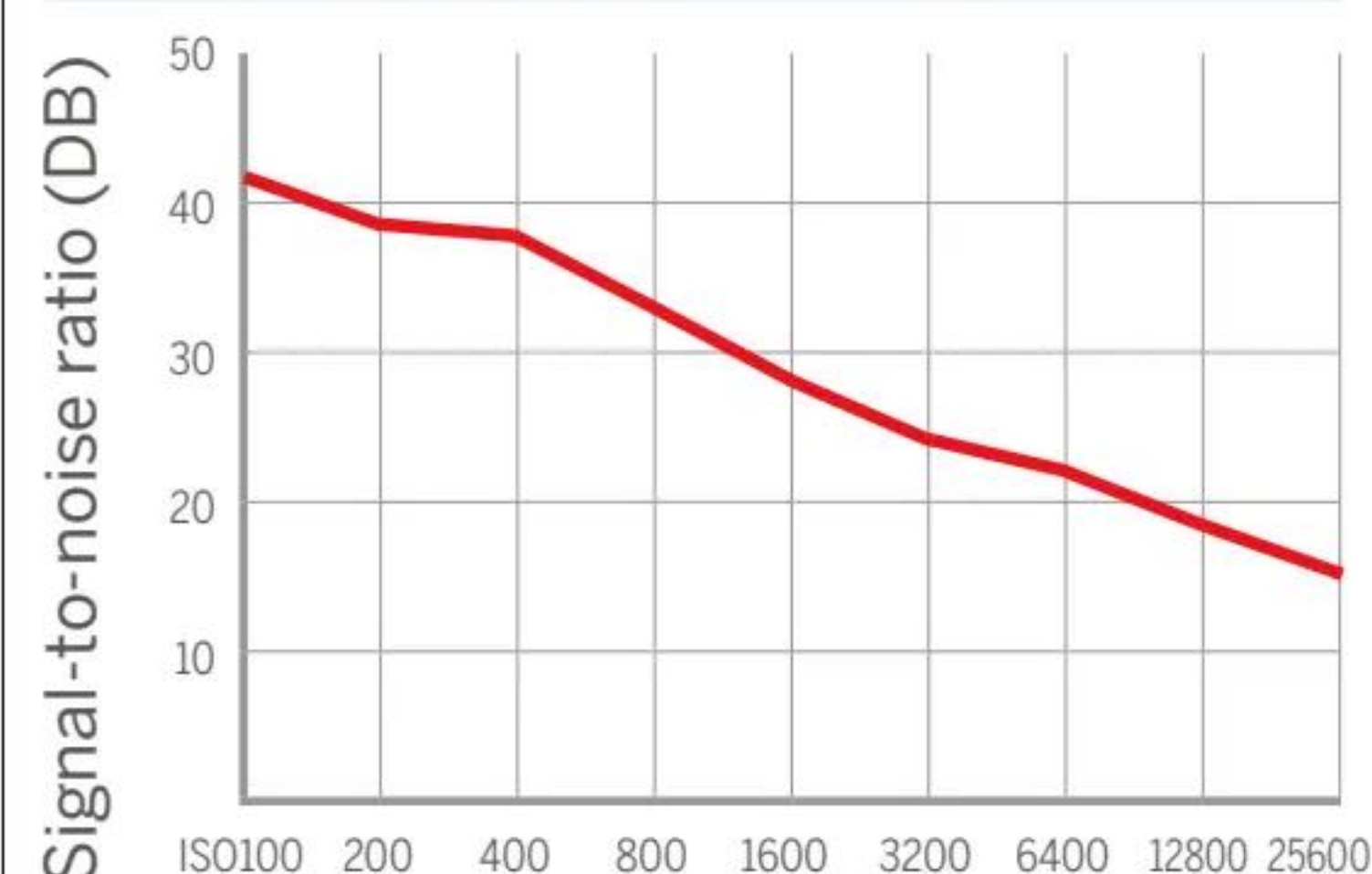
Literally a small wonder, the EOS R7 packs serious punch into its diminutive APS-C format build. Like the even smaller R10, it features all of the latest, deep-learned AI autofocus facilities, this time coupled to an even faster turn of speed, with mechanical shutter speeds of up to 1/8000 sec and a max drive rate of a blistering 30fps when using the electronic shutter option. And that's despite having a high-resolution 32.5MP image sensor.

Another major plus point of the R7 over other APS-C format R

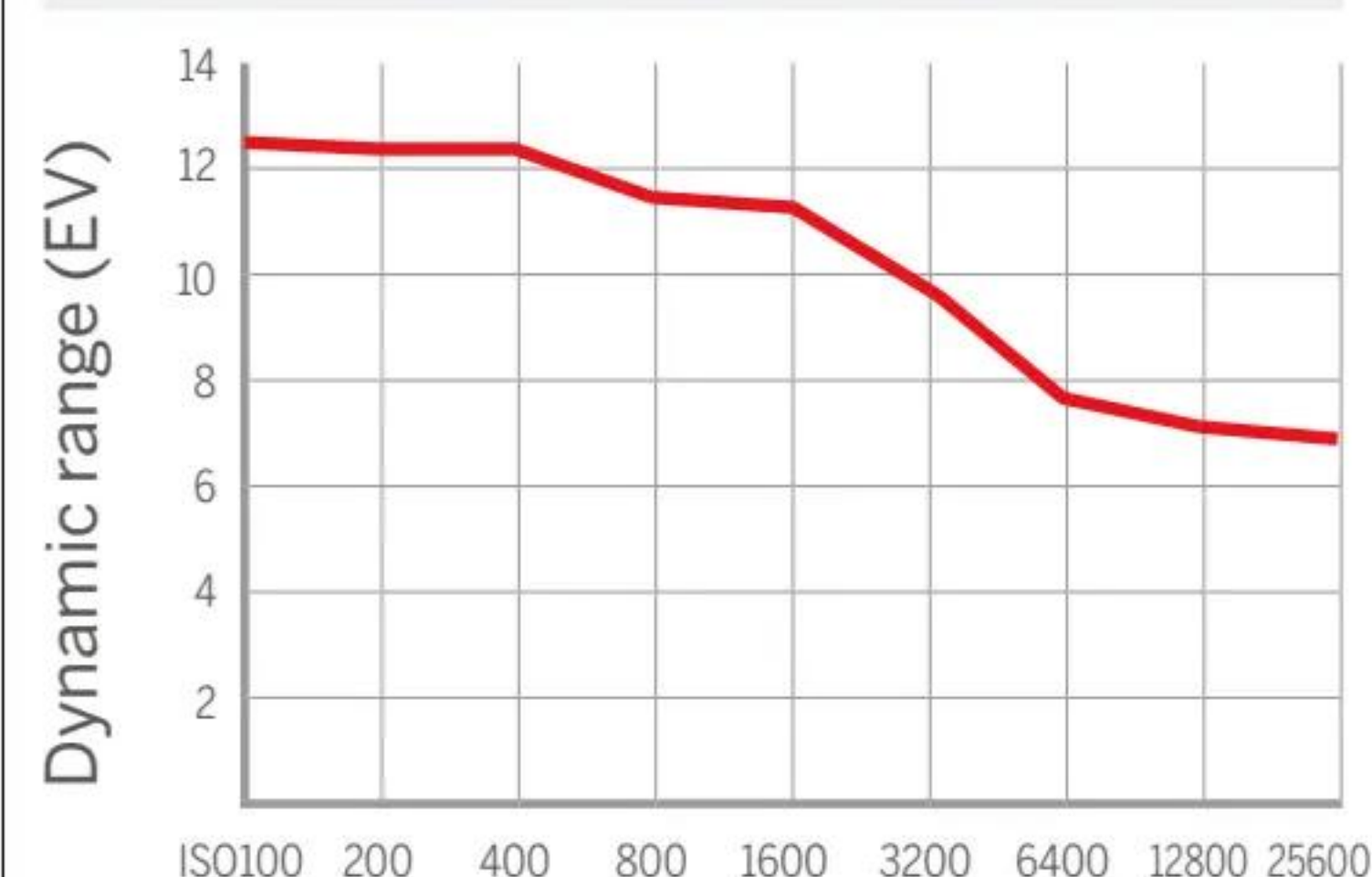
System cameras is that it features in-body image stabilization, with up to 8-stop effectiveness depending on the lens, even for lenses that don't feature optical stabilization. The electronic OLED viewfinder has the same dot-count of 2360k but this time it has a larger 1.15x magnification compared with the R10's 0.95x. The 3-inch rear Vari-Angle touchscreen is also a more high-res affair, with 1620k dots rather than 1040k.

The slightly bigger build accommodates two SD/HC/XC UHS-II card slots, and the larger

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



Dynamic range and noise suppression are very good at low ISO settings but drop off towards the high end

LP-E6NH battery withstands nearly twice as many viewfinder-based shots as the R10, totalling 500 (770 with the rear screen).

Performance

The 32.5MP image sensor enables excellent retention of fine detail in images and there's a boost in video performance as well, as you can shoot 4K 60p/50p footage with no additional crop factor on top of the inherent 1.6x of the APS-C format image sensor. All in all, the EOS R7 is simply the most powerful APS-C format camera ever.

FEATURES

- 01 In-body stabilization that's worth up to eight stops with some lenses
- 02 Deep-learned AI autofocus tracks humans, animals and vehicles
- 03 Top-rear is a concentric joystick and control wheel
- 04 The 1620k Vari-Angle touchscreen like those of the R50, R8 and R6 Mk II
- 05 Unlike the EOS R10, the R7 includes weather seals in its construction

VERDICT

FEATURES ★★★★★
BUILD & HANDLING ★★★★★
PERFORMANCE ★★★★★
VALUE ★★★★★
OVERALL ★★★★★

CANON EOS R £899/\$1222 (USED)

The EOS R is where it all started, but you're now limited to buying a used example

No longer in production, the EOS R started the mirrorless ball rolling. Typically, it has autofocus based on a Dual Pixel AF system that enables phase-detection autofocus points across most of the frame. In this case, though, there are 5,565 of them. Autofocus is rapid and works well even in near-darkness. The electronic viewfinder is a

real high-quality item but, as with the similarly first-generation EOS RP, there's no in-body image stabilization. There's no lack of drive speed for stills, with a max burst rate of 8fps, but a pedestrian 5fps with continuous autofocus. Image quality combines sumptuous colour rendition with excellent retention of fine detail.

★★★★★



FULL-FRAME



CANON EOS R8

£1699/\$1499

The EOS R8 gives you full-frame shooting for £350 more than the cost of the APS-C format EOS R7 mirrorless

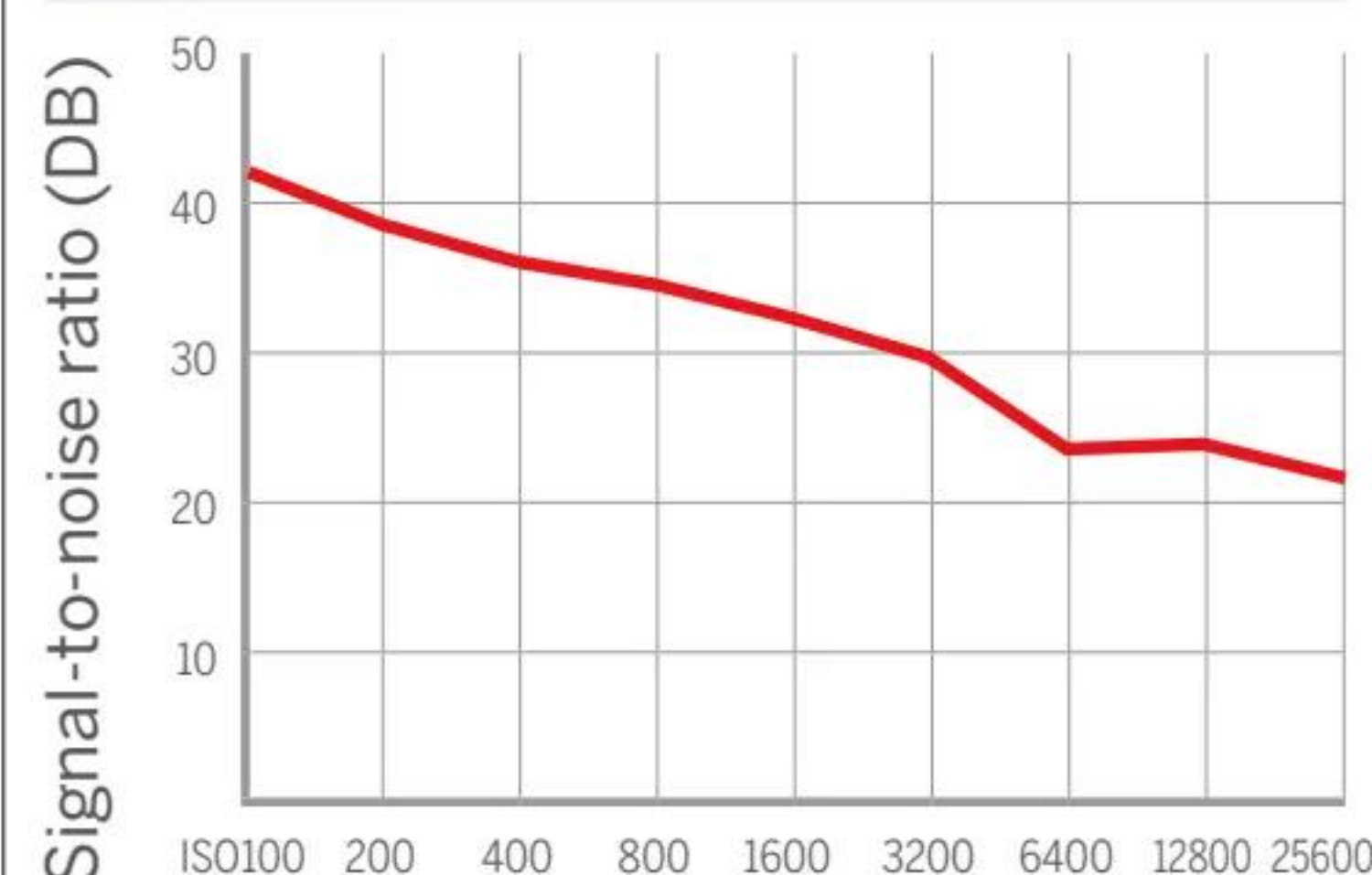
Just as the EOS R100 and R50 are very affordable, APS-C format mirrorless cameras, the R8 is a particularly budget-friendly full-frame model. Full-frame advantages include a tighter depth of field for creative shooting, along with better dynamic range and less image noise.

With their much larger image sensors, full-frame cameras tend to be bigger and heavier, but the surprisingly compact, lightweight R8 is actually smaller and lighter than the APS-C format EOS R7. That's partly due to the R8 running

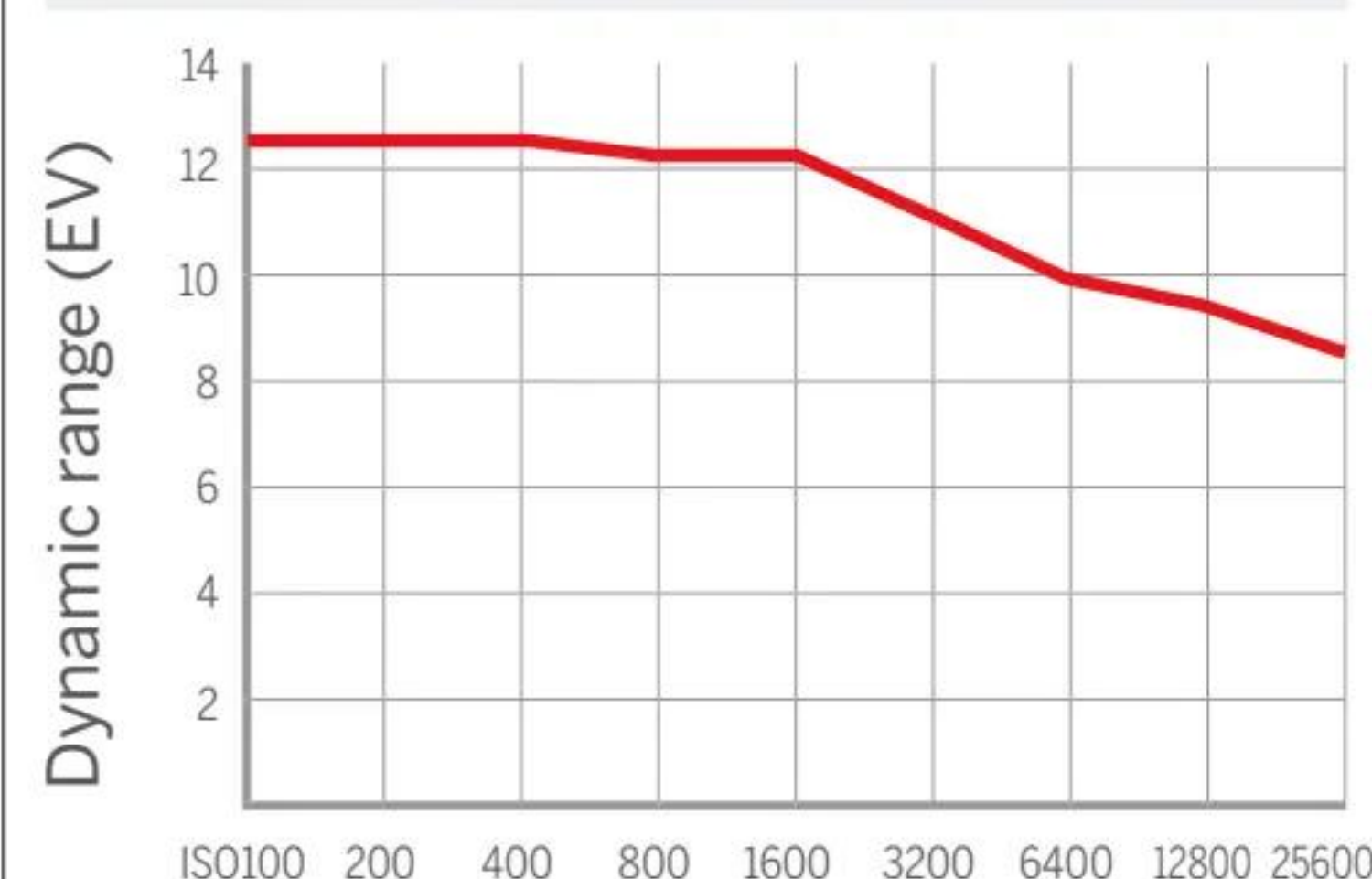
on a relatively small LP-E17 battery and only having one memory card slot, rather than dual slots. Like the original EOS R and RP full-frame mirrorless cameras, the R8 also lacks in-body image stabilization, instead relying on optically stabilized 'IS' lenses.

There's a lot to love here. It has the latest 24.2MP Dual Pixel CMOS II sensor and DIGIC X processor, as featured in the EOS R6 Mark II, along with the full range of deep-learned AI autofocus recognition. And although the drive rate tops out at 6fps, it's

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



The EOS R8 leaves all of the APS-C format R System cameras in its wake for high-ISO dynamic range and signal-to-noise

boosted to a super-fast 40fps in fully electronic shutter mode, once again matching the R6 Mk II, with a generous buffer depth.

Performance

Though the R8 only has a single card slot, it's SD/HC/XC UHS-II compatible, and its USB-C port is similarly 'superspeed', at V3.2. The USB port can also be used for power. The latest-gen autofocus system is typically breathtaking in speed and consistent accuracy and image quality is superb for both stills and video.

FEATURES

- 01 The viewfinder is small for a full-frame camera: 0.39 inches
- 02 The 3.0-inch, 1620k, Vari-Angle touchscreen is great for a full-frame camera at this price
- 03 The fairly small battery covers 220/370 shots (VF/LCD)
- 04 The fully electronic shutter option enables a max speed of 1/16,000 sec
- 05 Buffer depth covers more than 1,000 shots in JPEG mode

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

OVERALL

★★★★★



CANON EOS R5 £3149/\$2999

The original game-changing EOS R5 shoehorns stellar stills and video performance into a compact build

Although near-identical in size to the EOS R6 Mark II, the R5 packs a much higher-res 45MP image sensor, a dazzling (in a good way) 5760k dot electronic viewfinder, a 3.2-inch 2100k dot Vari-Angle touchscreen and CFexpress as one of its dual memory card slots.

As well as delivering feverishly high-res stills, it also takes video capture all the way up to 8K at 30/25/24fps, and 4K video at up to 120fps. Not just a phenomenal camera for hybrid stills/video users, you can effectively shoot both formats at once. As well as capturing stills at up to 20fps in full

FULL-FRAME



CANON EOS R6 MARK II

£2779/\$1999

A fabulous hybrid all-rounder, the R6 Mark II is a major upgrade over the original edition

The original EOS R6 was an impressive camera, although its megapixel count of 20.1MP left a little to be desired for stills and it was prone to overheating issues in 4K UHD video shooting. The Mark II addresses both issues with a new 24.2MP image sensor and a raft of other improvements. A true hybrid camera, it offers stellar autofocus performance and a blistering stills burst rate of up to 40fps, along with no time limit for video clips. While both are big improvements over the original R6, the Mark II

also delivers 4K video at up to 60p/50p with no crop factor.

In contrast with the R8, the maximum shutter speed with mechanical shutter (electronic first curtain) is 1/8000 sec rather than 1/4000 sec, although both cameras muster 1/16,000 sec in full electronic shutter mode. The R6 Mark II has more than twice the stamina with its larger LP-E6NH battery and it boasts dual UHS-II card slots. It also has a bigger 0.5-inch viewfinder and the definite advantage of in-body image stabilization.

electronic shutter mode (12fps mechanical), there's the option of shooting 8K video at 30fps and extracting 35.4MP stills from individual frames, albeit that they're in 16x9 aspect ratio.

Naturally, the R5 shares all of the autofocus and image stabilization advantages of the R6 Mark II. But it has a more pro-grade feel to its control layout. The shooting mode dial is replaced by a Mode button and rotary controller and there's a large OLED info display on the top panel, whereas the R6 Mark II has none.

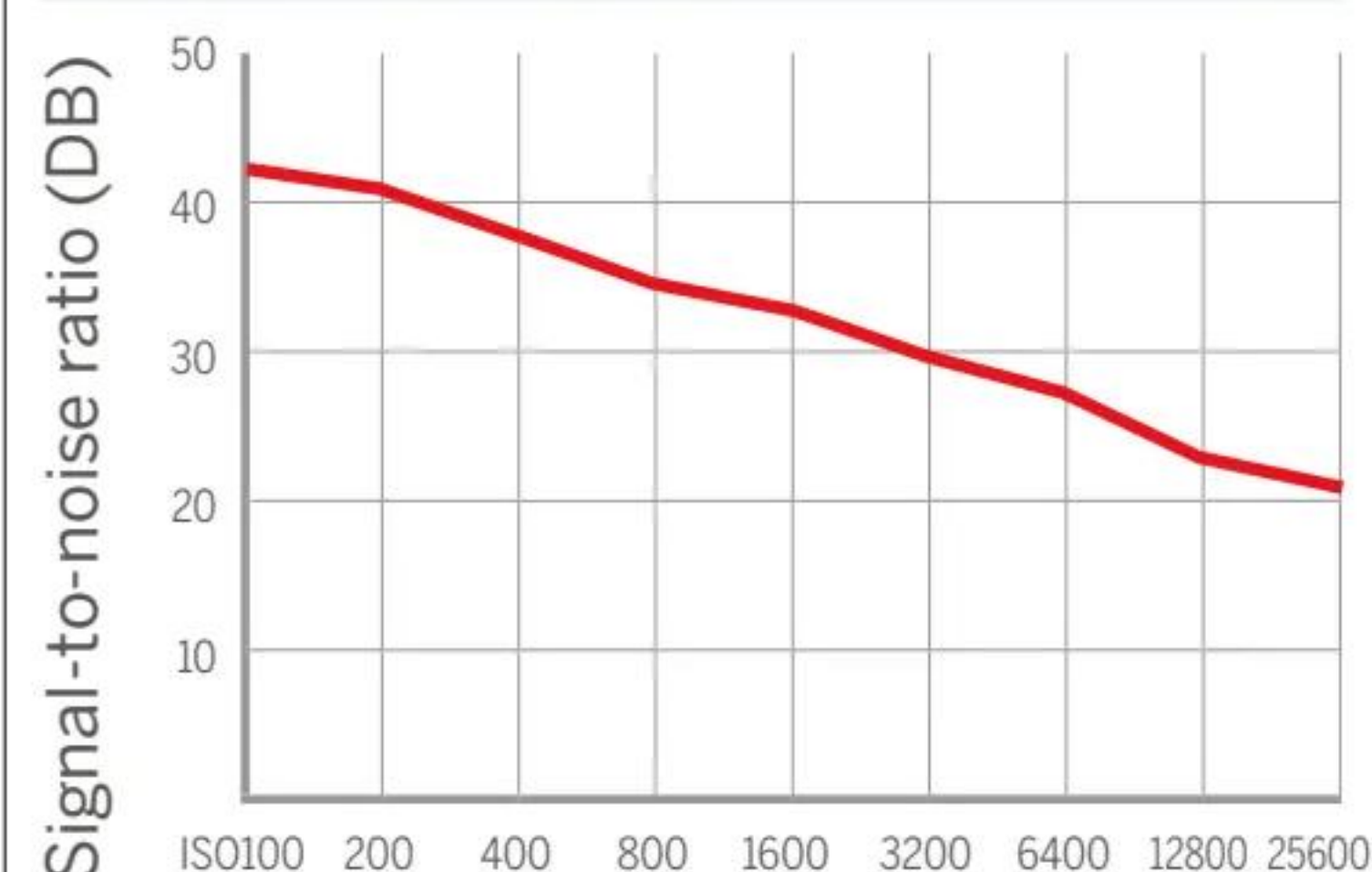
Performance

Quality and performance for both stills and video is simply spectacular. The only real downside of the R5 when it's put alongside the R6 Mark II, apart from its significantly steeper purchase price, would be that high-ISO image quality isn't as clean.

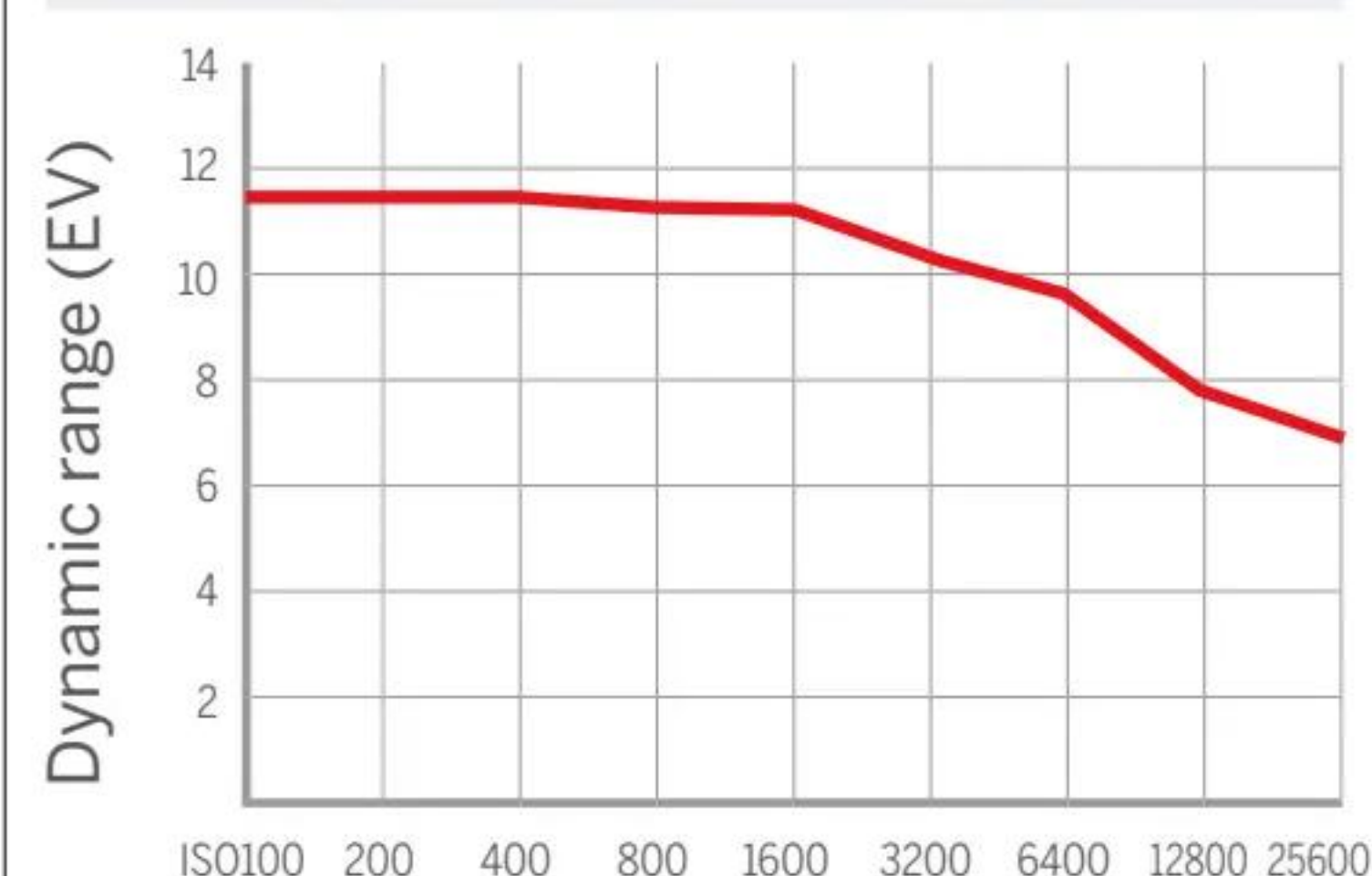
That being said, if you were looking to downsize and resample images taken at maximum resolution, a lot of the image noise disappears, or at least shrinks to the same level as images taken on an R6 Mark II.

★★★★★

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



The EOS R6 beats the R5 for dynamic range and signal-to-noise performance at high ISO settings

One handling bonus featured in both cameras is a stills/video switch at the left of the top panel. This makes switching between the shooting modes seamless.

Performance

Despite the hike in megapixel count, the R6 Mark II delivers squeaky-clean image quality even at very high ISO settings, while its autofocus system works right down to -6.5EV. That will equate to shooting in almost complete darkness, under less than a half-moon with no other lighting.

FEATURES

- 01 Shooting mode dial has three custom settings options
- 02 No secondary info display given on the top panel
- 03 The 3.0-inch Vari-Angle touchscreen isn't as big or high-res as that of the R5
- 04 Joystick controller and control dials at front, back and rear mean good handling
- 05 The dual memory card slots are SD/HC/XC UHS-II type

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

OVERALL

★★★★★



The Canon EOS R5 features an OLED screen on top of the camera, a feature missing from the R6 Mark II



CANON EOS R5 MARK II

£4499/\$4299

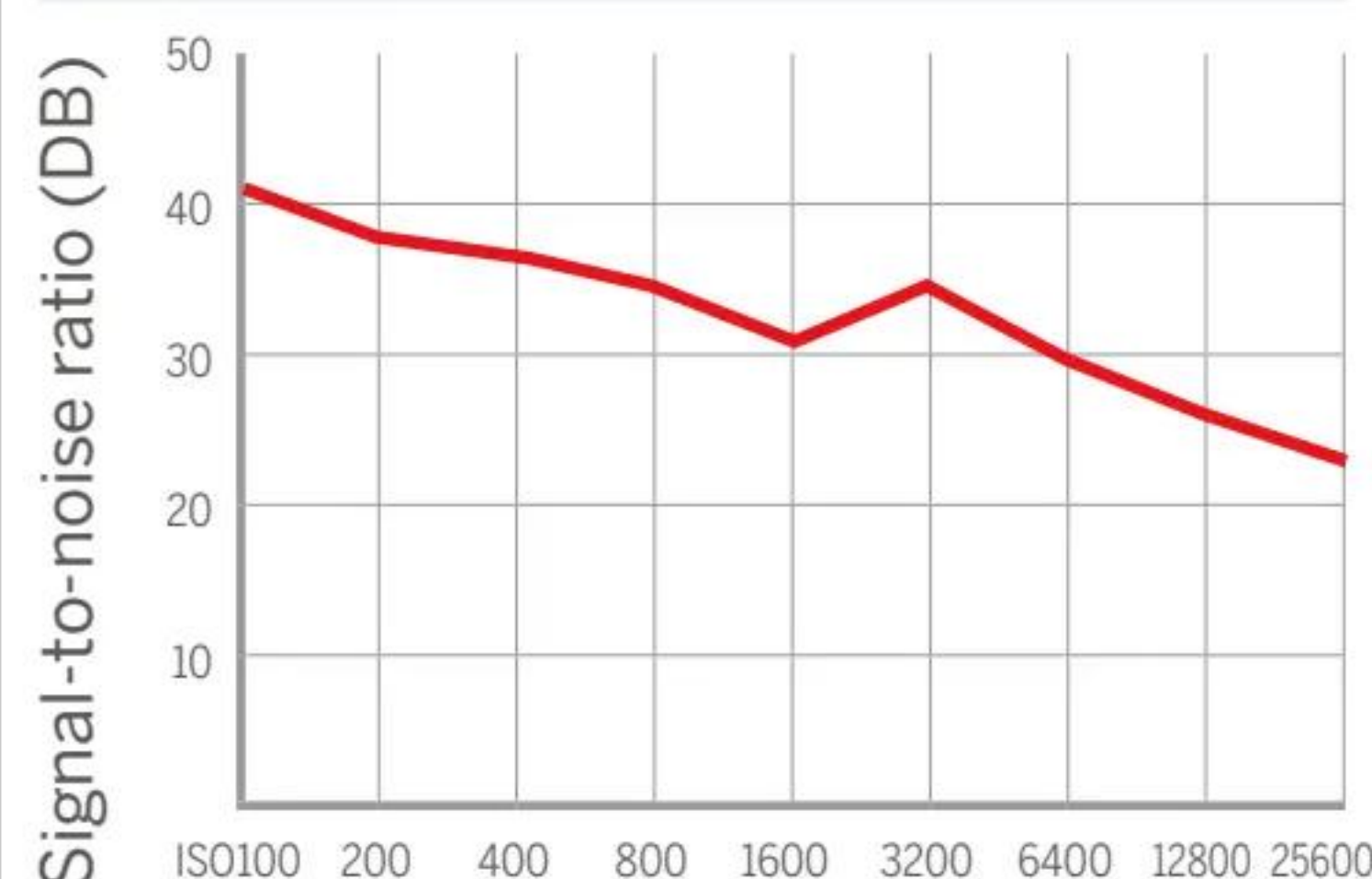
This new R5 version takes photography to the next level once again, with powerful, groundbreaking features

There's nothing wrong with the original EOS R5, which remains a formidable camera, but the Mark II takes it all up a few notches. At its heart is a 45MP back-illuminated, full-frame stacked CMOS image sensor and DIGIC X processor, but now with a brand new, secondary DIGIC Accelerator image processor. The result is that the camera ushers in a new era of 'Neural Network Image Processing', AI algorithms and deep-learning. Bonuses include the ability to upscale native 45MP images to

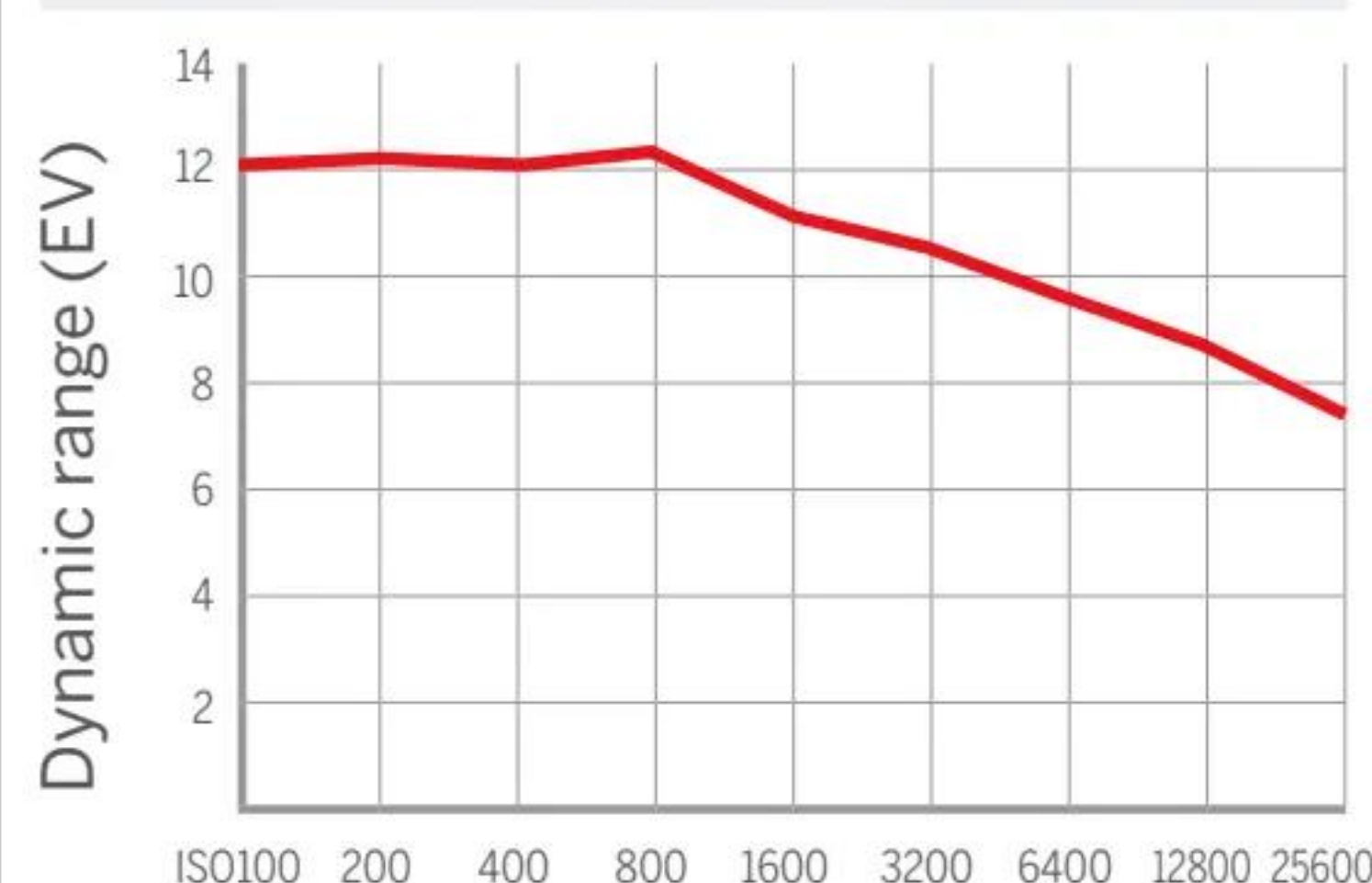
ultra-high-res 180MP pictures, and reduce image noise in high-ISO shots by two stops.

There's also a revolution in AI-powered autofocus. As well as the subject recognition and tracking we've come to love, the EOS R5 Mark II features a new Action Priority mode. It has dedicated modes for ball sports, automatically 'recognising' and tracking the player who has possession. Then there's Registered People Priority, in which you can store the faces of up to ten people and the camera will recognise

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



The next-generation 45MP image sensor gives a boost to both signal-to-noise and dynamic range performance

them on entering the frame. Oh, and IBIS gets a boost to as much as 8.5-stop performance.

Performance

Despite its high megapixel count, the camera is certainly no slouch. In electronic shutter mode, it can shoot with shutter speeds of up to 1/32,000 sec, at frame rates of up to 30fps. Video performance is similarly impressive, capturing up to 8K 60p in RAW with minimal rolling shutter effect. It's not only the best stills camera or the best camera for video, it's both.

FEATURES

- 01 Super-fast readouts of the new image sensor minimize the rolling shutter effect
- 02 Dual DIGIC X and DIGIC Accelerator processors take in-camera AI to the next level
- 03 Shoot at up to 4K 120p or FullHD 240p: super-slow-motion
- 04 Critical components designed to improve heat dissipation
- 05 Excellent ergonomics, putting creative control within easy reach

VERDICT

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

PERFORMANCE

★★★★★

VALUE

★★★★★

OVERALL

★★★★★

CANON EOS R6

£1099/\$1499 (USED)

The original EOS R6 makes a wise second-hand buy, a step up from the EOS R

Along with the higher-res EOS R5, the 20.1MP full-frame EOS R6 brings improvements on first-gen EOS R and RP cameras. The headlines are in-body image stabilization, an 'artificially intelligent' deep-learned autofocus system, and dual memory card slots. More lightweight than the R5, the R6 has a smaller Vari-Angle touchscreen

and a lower-res electronic viewfinder, though it's still highly detailed with 3.39 million dots. Unlike with the R5, video capture tops out at 4K and, with less need for speed in data throughput, both memory card slots are SD/HC/XC UHS-II (no CFexpress). Next to the EOS R6 Mark II, it has a lowly 20.1 megapixel count.

★★★★★





CANON EOS R3

£5499/\$4999

With no aim to be a 'compact system camera', the EOS R3 is a real big-punching heavyweight

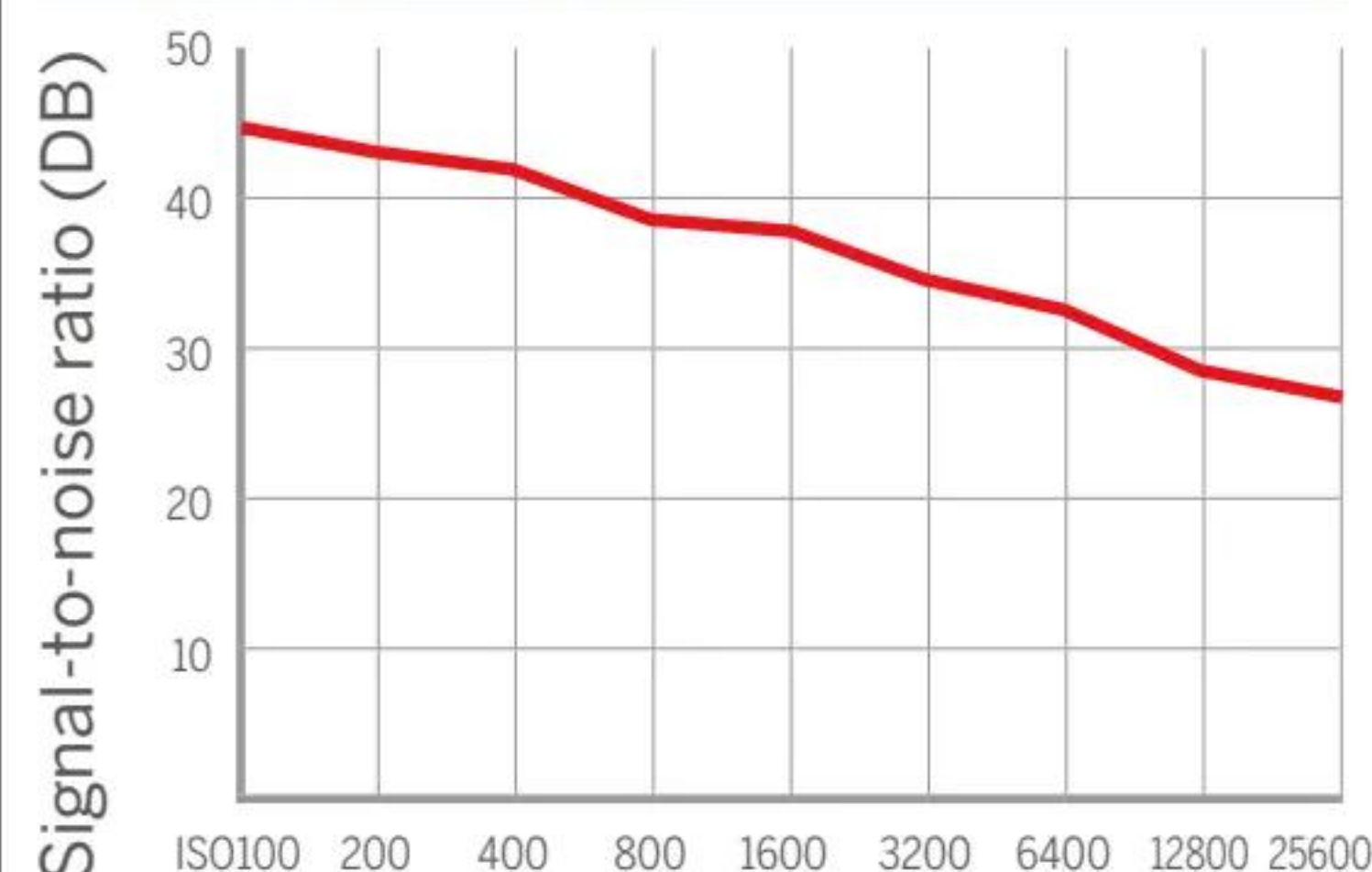
With the kind of integrated vertical grip typical of top pro cameras like the EOS 1-DX series, the R3 perfectly replicates its important controls for both orientations. And it does so in fine style, with epic build quality and a classy finish. The 24.1MP image sensor may seem low in megapixel count but there's a big uptick in speed.

Thanks to its stacked, back-illuminated design and ground-breaking tech, the sensor has super-fast readout speeds that enable a 30fps constant drive rate

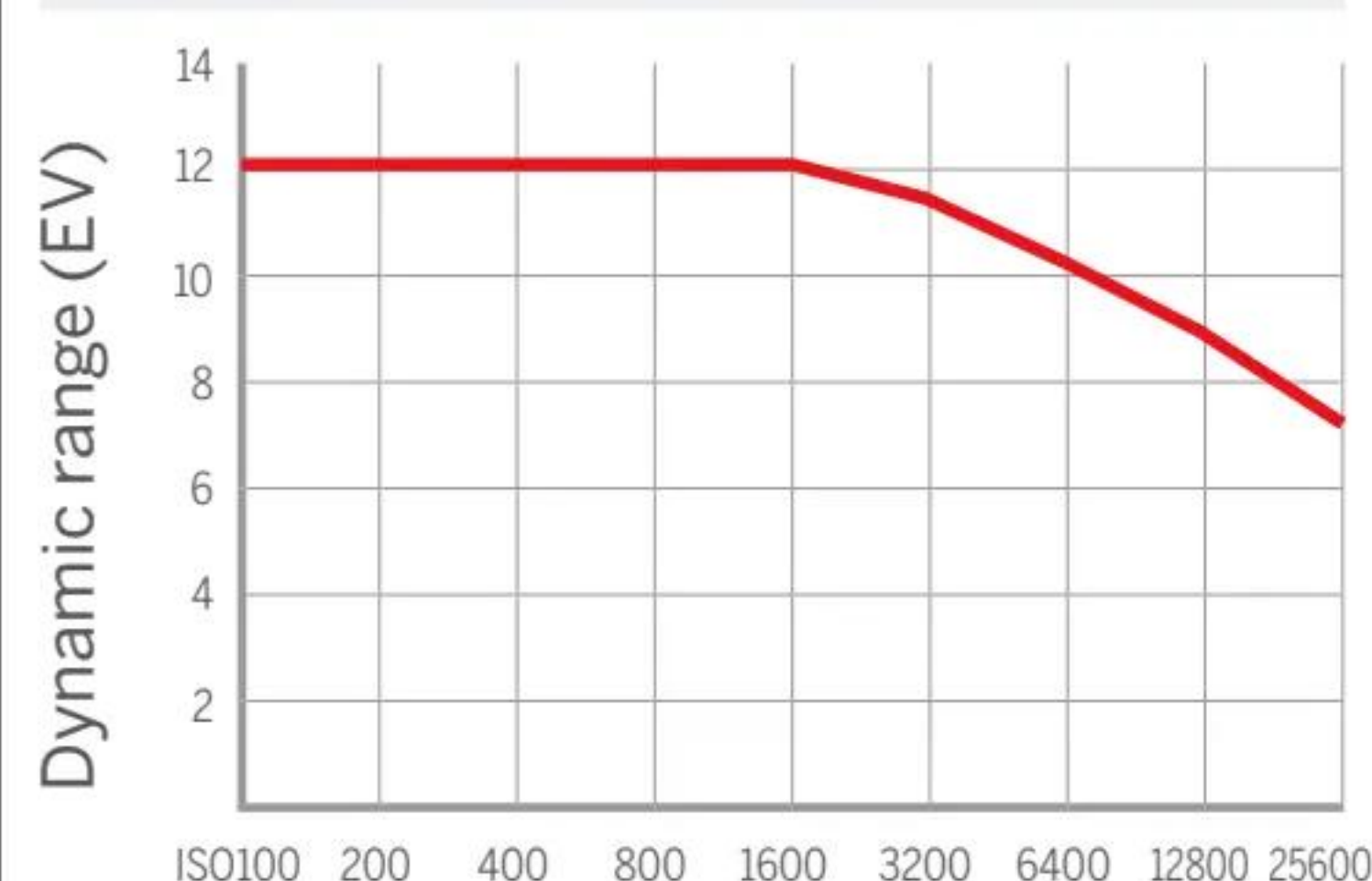
for stills, and with no viewfinder blackout. Another plus for both stills and video are that the readout speed nearly eliminates the rolling shutter effect, and shutter speeds go up to an incredible 1/64,000 sec. For video, the R3 bridges the gap between the 4K R6 Mark II and 8K of the original R5, outputting 6K footage at up to 60p.

As you'd expect, the R3 has the same deep-learned AI autofocus of most other recent R System cameras, for 'intelligent' acquisition and tracking of people, animals and vehicles. But it also adds Eye

RAW* SIGNAL-TO-NOISE RATIO



RAW* DYNAMIC RANGE



High-ISO signal-to-noise is almost as good as from the EOS R6 Mark II, and dynamic range is highly impressive

Control AF, in which the camera can detect what you're looking at through the viewfinder and shift the active AF point accordingly.

Performance

In terms of speed, accuracy and consistency, the range of high-end features come together brilliantly well. For action, sports, wildlife, weddings and pretty much anything else that demands nailing the definitive moment, the R3 makes it almost impossible to miss a shot. And the quality of the results is simply superb.

FEATURES

- 01 The built-in vertical grip perfectly duplicates controls for portrait shooting
- 02 It has a Vari-Angle touchscreen on the back, unlike most pro-spec cameras
- 03 The top panel has a mono OLED info display with a similar layout to the EOS R5
- 04 Dual card slots with both SD/HC/XC UHS II and CFexpress type B
- 05 The big battery, LP-E19, runs to 620 (viewfinder) shots

VERDICT

FEATURES ★★★★★
BUILD & HANDLING ★★★★★
PERFORMANCE ★★★★★
VALUE ★★★★★
OVERALL ★★★★★

CANON EOS R1 £6999/\$6299

Canon's action hero is back in mirrorless guise, a worthy successor to the 1D

Like the EOS R3, this is a pro-spec beast of a camera with a built-in vertical grip. It feels a real handful but in a good way, with very natural handling when you're using big, heavy telephoto lenses. And that's probably more often than not, given the camera's ideal high-performance for sports and wildlife photography. It features the same

next-generation AI-based autofocus and other advantages of the similarly new EOS R5 Mark II, but with a lower-resolution 24.2MP back-side illuminated full-frame stacked CMOS image sensor. Even so, you can again upscale images in-camera, this time to 96MP. You also get frame rates of up to 40fps for stills and 6K 60p for video. Now that's what we call sporty!



COMPARISON TABLE

	APS-C				FULL-FRAME			
								
	Canon EOS R100	Canon EOS R50	Canon EOS R10	Canon EOS R7	Canon EOS R8	Canon EOS R6 Mark II	Canon EOS R5 Mark II	Canon EOS R3
Announced	May 2023	February 2023	May 2022	May 2022	February 2023	November 2022	July 2024	November 2021
Price (body only)	£559/\$599	£789/\$799	£999/\$979	£1349/\$1499	£1699/\$1499	£2779/\$1999	£4499/\$4299	£5499/\$4999
Format	APS-C	APS-C	APS-C	APS-C	Full-frame	Full-frame	Full-frame	Full-frame
Sensor	24.1MP Dual Pixel CMOS	24.2MP Dual Pixel CMOS II	24.2MP Dual Pixel CMOS II	32.5MP Dual Pixel CMOS II	24.2MP Dual Pixel CMOS II	24.2MP Dual Pixel CMOS II	45MP BSI Stacked CMOS	24.1MP Dual Pixel CMOS II
Image processor	DIGIC 8	DIGIC X	DIGIC X	DIGIC X	DIGIC X	DIGIC X	DIGIC Accelerator + DIGIC X	DIGIC X
Sensor-shift stabilization	No	No	No	Yes, up to 8-stop	No	Yes, up to 8-stop	Yes, up to 8.5-stop	Yes, up to 8-stop
Autofocus points	3975, dual pixel	4503, dual pixel	4503, dual pixel	5195, dual pixel	4897, dual pixel	4897, dual pixel	5850, dual pixel	4779, dual pixel
Subject AF	Humans	Humans, animals, vehicles	Humans, animals, vehicles	Humans, animals, vehicles	Humans, animals, vehicles	Humans, animals, vehicles	Humans, animals, vehicles, action	Humans, animals, vehicles
ISO range (expanded)	ISO100-12,800 (25,600)	ISO100-32,000 (51,200)	ISO100-32,000 (51,200)	ISO100-32,000 (51,200)	ISO100-102,400 (50-204,800)	ISO100-102,400 (50-204,800)	ISO100-51,200 (50-102,400)	ISO100-102,400 (50-204,800)
Shutter speeds (electronic)	1/4000 to 30s, Bulb	1/4000 (1/8000) to 30s, Bulb	1/4000 (1/16,000) to 30s, Bulb	1/8000 (1/16,000) to 30s, Bulb	1/8000 (1/16,000) to 30s, Bulb	1/8000 (1/16,000) to 30s, Bulb	1/8000 (1/32,000) to 30s, Bulb	1/8000 (1/64,000) to 30s, Bulb
Max burst rate, buffer	6.5fps, 97 JPEG, 6 raw	12/15fps, 42/28 JPEG, 7/7 raw	15/23fps, 460/70 JPEG, 29/21 raw	15/30fps, 224/126 JPEG, 51/42 raw	6/40fps, 1000+/120 JPEG, 1000+/56 raw	12/40fps, 1000+/190 JPEG, 110/75 raw	12/30fps, 760/200 JPEG, 230/93 raw	12/30fps, 1000+/540 JPEG, 1000/150 raw
Viewfinder	0.39" OLED, 2360k dots	0.39" OLED, 2360k dots	0.39" OLED, 2360k dots	0.39" OLED, 2360k dots	0.39" OLED, 2360k dots	0.5" OLED, 3690k dots	0.5" OLED, 5760k dots	0.5" OLED, 5760k dots
LCD screen	3.0-inch, 1040k, fixed	3.0-inch, 1620k, touch, vari-angle	3.0-inch, 1040k, touch, Vari-Angle	3.0-inch, 1620k, touch, Vari-Angle	3.0-inch, 1620k, touch, Vari-Angle	3.0-inch, 1620k, touch, Vari-Angle	3.2-inch, 2100k, touch, Vari-Angle	3.2-inch, 4150k, touch, Vari-Angle
Stills file types	RAW, C-Raw, JPEG	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF	RAW, C-Raw, JPEG, HEIF
Max video resolution	4K at 30/25/24fps	4K at 30/25/24fps	4K at 60/50/30/25/24fps	4K at 60/50/30/25/24fps	4K at 60/50/30/25/24fps	4K at 60/50/30/25/24fps	8K at 60/30/25/24fps	6K at 60/50/30/25/24fps
Memory	1x SD/HC/XC UHS-I	1x SD/HC/XC UHS-I	1x SD/HC/XC UHS-II	2x SD/HC/XC UHS-II	1x SD/HC/XC UHS-II	2x SD/HC/XC UHS-II	1x CFexpress B, 1x SD/HC/XC UHS-II	1x CFexpress B, 1x SD/HC/XC UHS-II
Connectivity	USB 2.0, Wi-Fi, BLE	USB 2.0, Wi-Fi, BLE	USB 2.0, Wi-Fi, BLE	USB 3.2C, Wi-Fi, BLE	USB 3.2C, Wi-Fi, BLE	USB 3.1C, Wi-Fi, BLE	USB 3.2C, Wi-Fi, BLE	USB 3.2C, Wi-Fi, BLE
Battery type	LP-E17	LP-E17	LP-E17	LP-E6NH	LP-E17	LP-E6NH	LP-E6P	LP-E19
Battery life	340/430 shots (VF/LCD)	310/440 shots (VF/LCD)	260/430 shots (VF/LCD)	500/770 shots (VF/LCD)	220/370 shots (VF/LCD)	450/760 shots (VF/LCD)	340/630 shots (VF/LCD)	620/860 shots (VF/LCD)
Size (WxHxD, body)	116x86x69mm	116x86x69mm	123x88x83mm	132x90x92mm	133x86x70mm	138x98x88mm	139x101x94mm	150x143x87mm
Weight (body + card, battery)	356g	375g	429g	612g	461g	670g	746g	1015g
FEATURES	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & HANDLING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
PERFORMANCE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
VALUE	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

THE WINNERS ARE... FULL-FRAME: EOS R5 Mark II APS-C: EOS R7

This pair of EOS cameras are all-time greats in the full-frame and APS-C format categories

The top-pro Canon EOS R3 and EOS R1 may look the most impressive in the range, but they're weighty beasts with a higher spec than most of us would ever need. Our favourite in the range is the new EOS R5 Mark II. It's more compact, yet bristling with top-flight performance. Even so,

at less than half the price, the smart money is on the EOS R6 Mark II, with its more modest megapixel count. On a budget, the EOS R8 is a very good full-frame camera but lacks IBIS. For an APS-C format camera that gives greater depth of field and extended telephoto reach without going extra-large on

lenses, there's no beating the EOS R7. It's a high-spec camera with an impressive feature set and superb handling. While the EOS R50's superior image sensor, processor, 'intelligent' multi-subject autofocus system and Vari-Angle touchscreen make it a best buy out of the APS-C cameras.



TAKE YOUR LANDSCAPES TO THE NEXT LEVEL WITH THIS COMPREHENSIVE GUIDE

Whether it's cloudless skies, unexpected weather or tricky light conditions, this book is full of guides and projects to help you to tackle every landscape. Explore shooting at the classic honeypot spots as well as navigating to more unique locations. Plus, get pro kit advice, composition tips and learn key shooting techniques.



┌
FUTURE
└

┌ Ordering is easy. Go online at:
magazinesdirect.com
└ Or get it from selected supermarkets & newsagents

CANON EOS R5 MARK II

We go in-depth into Canon's AI mirrorless full-frame camera, starting with our full hands-on test and performance verdict

The Canon EOS R5 Mark II has one hell of an act to follow. The original R5 was the best camera that Canon has ever made – in fact it was so good that, despite being launched back in 2020, it's still better than almost any camera on the market today. The Z8 and Z9 might be Nikon's flagships, but in terms of specs they're basically on par with the original EOS R5.

Beating its four-year-older brother is no mean feat, then, but the Canon EOS R5 Mark II manages more than just being an obligatory update: this is a truly transformative camera that shifts all the goalposts – having tracked them with its new ball-detecting autofocus – and proceeds to score thunderous goal after thunderous goal.

Neural net-powered in-camera upscaling and denoising, monster resolution for stills and video,

The EOS R5 Mark II is, once again, Canon's most important and most powerful camera ever made



JAMES ARTAIUS
OUR CANON CAMERA TESTER

James Artaius is our go-to Canon expert. He started out at Future as our *PhotoPlus* technique editor, and for the past six years he's been editor and chief Canon gear tester on our world-leading camera and photography website [DigitalCameraWorld.com](https://www.digitalcameraworld.com)



better-than-ever image stabilization, never-before-seen autofocus tech that is light years ahead of the competition... the measuring stick just changed around here.

AI algorithms

But there is much more to this camera than meets the eye. I've already mentioned the Neural network Image Processing, which uses AI algorithms and deep learning to enable features like In-Camera Upscaling (which turns standard 45MP images into monster 180MP files) and High ISO Noise Reduction (which denoises images by 2 stops). I go in-depth on why I think these in-camera AI features are going to change everything, see more on digitalcameraworld.com.

Speaking of AI, we need to talk about the new autofocus systems. There are the usual granular improvements and refinements, and

The R5 Mk II gets a choice of three battery grips to extend battery life and for more control shooting vertically; the standard BG-R20 grip (above), the BG-R20EP with an ethernet port, and a cooling fan grip

Using the R5 Mk II's new Action Priority makes it so easy to focus on the action



James Artaius



James Artaius

Registered People Priority: just photograph your subject's face, register it in the menu...



James Artaius

...and the R5 Mark II will automatically detect it, even in a crowd. You can register and prioritize up to ten faces, so the AF always knows who to focus on unless told otherwise

horses and aeroplanes have been added to subject detection mode, but trust me – the new stuff is way better than that.

First up is Action Priority mode, which works with any sport featuring a circular ball that's constantly in play – and includes dedicated modes for basketball, 'soccer' and volleyball. Canon has trained this with deep learning AF to recognize body movements and so it can not only track the player who has possession of the ball, it can also predict where the ball is going next and somehow always focus on the right person.

The camera will recognize a spike in volleyball, and understand that the ball is likely to catapult across the court. It will recognize an 'alley oop' in basketball, and know that a player is about to receive a lob before throwing down a jam!

As long as there's a ball on the court or field of play, Action Priority mode will know where to focus – unless you tell it otherwise.

Registered People Priority

One of the ways you can do so is via Registered People Priority, a mode that takes face detection to the extreme. You can register the faces of up to ten people, either by taking their photo in person or by taking a photo of them on the internet. The camera will then recognize their face and automatically jump to it if it appears in the frame.

What if more than one of your Registered People is in the frame? Well, that's where the Priority part comes in: you rank those ten faces in order of priority. For example, if you're photographing a sport, you can assign the home team's star player to number one, the opposing

A fluffy tan and white dog is captured mid-jump in a sun-dappled forest. The dog's front paws are extended upwards, showing dark pads. Its eyes are focused and bright, and its ears are perked up. The background is a soft-focus mix of green moss and brown forest floor debris.

Focusing on animal's
eyes has never been
easier with all the
new AI autofocus
features on the
EOS R5 Mark II



team's star to number four, and the home coach to number ten. At a wedding, the bride and groom are one and two, then important guests follow. Or news reporters can prioritize celebrities or politicians at media scrums.

The camera will detect any registered face, and prioritize the highest ranked – while also giving you the option to quickly flick between them if you need. This is all made possible by Canon's new dedicated Digic Accelerator chip – a secondary processor that works in tandem with the latest Digic X processor to deliver the evolved Dual Pixel Intelligent AF system, offering AF and tracking computation at up to 60fps with the electronic shutter.

This tag team not only facilitates things like Action Priority and Registered People Priority, it also provides unprecedented stickiness to the subjects it detects and tracks. I know that all camera systems promise to be able to follow subjects even when something obstructs the view, but the Canon EOS R5 Mark II actually does it.

I prioritized the face of a single player in a three-on-three basketball

The Cooling Fan CF-R20EP battery grip aims to combat overheating to extend video recording times of the R5 Mk II

Just like its predecessor, the R5 Mark II gets a top LCD to check exposure settings etc



game; even when he was on the other side of the court being smothered by the defence, and even with other players or spectators frequently blocking my view, the R5 Mark II always held true and stuck with him – this was even when his face was tiny in the frame and barely visible beneath an armpit. It even recognized the back of his head!

The advanced AF subroutines are also complemented by an upgraded version of the Eye Control AF system that debuted on the Canon EOS R3. The new Eye Control AF technology is better than ever, enabling you to move your focus point around the viewfinder simply by moving your eye.

Video god

As you'd expect of the first consumer camera series to boast 8K video, the Canon EOS R5 Mark II

doubles down on high-resolution video. In fact, the R5 Mark II captures higher-resolution video than the flagship EOS R1.

The R5 Mark II can capture 8K DCI Lite RAW at up to 60p, 8K DCI and UHD at up to 30p, 4K DCI SRAW at up to 60p, 4K DCI and UHD at up to 120p, and 2K DCI and FullHD at up to 240p – and all high frame rates now capture audio. There are also 35mm crops for 4K DCI and UHD up to 60p, and 2K DCI and FullHD up to 240p.

The camera is more integrated into the Cinema EOS system than ever, offering Canon Log 2 and 3 with Canon 709/BT.709 Std, PQ/HLG and HDR movie mode, along with custom picture, proxy recording, LPCM / 24-bit / 4-channel audio, and finally a full-size HDMI port and tally lamp (with "red box" tally indicator on the rear screen).



CANON EOS R5 MARK II

SPECIFICATIONS

- SENSOR** 45MP back-illuminated full frame stacked CMOS sensor
- LENS MOUNT** Canon RF
- AUTOFOCUS** Dual Pixel Intelligent AF cross-type, 5850 AF points stills / 4500 AF points movies
- IMAGE STABILIZATION** 8.5 stops centre, 7.5 stops corners
- ISO RANGE** 100 to 51,200 (exp 50 to 102,400)
- VIDEO** 8K 60p, 4K 120p, 2K 240p, FullHD 240p
- VIEWFINDER** 0.5-inch OLED, 5.76 million dots, 120 / 60fps, 0.76x magnification, Eye Control AF
- LCD** 3.2-inch TFT, 2.1 million dots
- MEMORY** 1x CFexpress Type B (up to 2TB), 1x SD UHS-II card
- MAX BURST** 30fps electronic (200 JPEG or 93 RAW CFexpress / 86 RAW SD), 12 fps mechanical (760 JPEG or 230 RAW CFexpress / 95 RAW SD)
- CONNECTIVITY** Wi-Fi (6G / 5G / 2.4G), Bluetooth, USB-C, HDMI, ethernet, microphone, headphone, N3 remote terminal, PC Sync output, GPS, Multi-function Shoe
- SIZE** 138.5 x 101.2 x 93.5mm
- WEIGHT** 656g body only / 746g with card and battery
- PRICES** £4499 / \$4299, or £5749 / \$5399 with RF 24-105mm F4L IS USM kit

How about the overheating woes that blighted the launch of the original R5 during video? Well, the internals have been designed with individual graphite sheets for the sensor and card slot boards to dissipate heat to the exterior, with the boards for the card and the sensor and engine being separated by an aluminium plate.

In addition, a passive cooling system incorporates exhausts on the

body and vents that run through the camera to allow air to move through and heat to escape. There is also an external cooling fan 'battery' grip (one of three different battery grips available, actually) that turns the passive cooling system into an active one, by blowing air through the vents and cooling the camera (see top left). This results in enviable recording times before the camera starts to overheat. Figures below.

CANON EOS R5 MARK II PERFORMANCE WHEN SHOOTING VIDEO

With Auto power off temperature set to Standard			With Auto power off temperature set to High		
Resolution	Camera	With Fan at High	Resolution	Camera	With Fan at High
8K 60p RAW LT	18 mins	21 mins	8K 60p RAW LT	18 mins	21 mins
8K 30p Long GOP	26 mins	106 mins	8K 30p Long GOP	37 mins	120 mins+
4K 120p Long GOP	22 mins	26 mins	4K 120p Long GOP	22 mins	26 mins
4K 60p Long GOP	45 mins	No restriction	4K 60p Long GOP	120 mins+	No restriction

Performance

In short – WOW! What a performer! Shooting 45MP images at 30fps is nothing new in the current camera market, but shooting 45MP images at 30fps with consistent autofocus is like manna from heaven for us photographers.

I've repeatedly said how Canon's Dual Pixel AF II is the best autofocus system in the world, but that milestone has just been left in the rear view mirror: Dual Pixel Intelligent AF is simply the standard by which all autofocus systems will now be judged.

I've seen predictive autofocus algorithms before (in the Sony A9 III – and I felt the system was pretty clever, but was too easily duped by twitch movements that zigged when it expected them to zag). Canon's Action Priority, though? Oh my, this is almost like the way the camera sticks to your player while you're



playing 2K games. I was fully expecting this system to have blindspots, so I did my best to find them. The video Canon showed me, depicting the camera capturing a basketball player's alley oop with player-perfect focus, looked too good to be true. So when I heard two ballers call for an alley oop during their pick-up game, I made sure my camera was pointing in the right direction.

Sure enough, the ball handler lobbed the ball in the air, over the

It's easy to forget that the R5 Mk II is so compact in your hands and easy to control

The R5 Mk II thrives when shooting at high ISO settings of around 6400 in low light places

head of the defender, and his teammate leaped to catch it in midair and complete the play with a slam dunk. And the R5 Mark II tracked and kept focus during every frame of it. That. Is. Impressive. Most AF systems get fooled by plays like this, as it's exactly the "zagging instead of zigging" I was talking about. Nope, not here.

I've already waxed lyrical about the Registered Person Priority, but I haven't mentioned the other AF input: Eye Control AF. This is an

evolved version of the technology in the Canon EOS R3, which features an oversized electronic viewfinder packed with infrared blasters that can track the movement of your eyeball to change the focus.

Once calibrated, simply look around the finder and it will hover an AF point over whatever you're looking at; simply half-press the shutter button, et voila, you can snap focus wherever you want it, as fast as you can look at it. I was impressed by this tech on the R3, but it's easily twice as good here – which Canon's claims – much more responsive to granular movement, and it has a much longer detection range. Which means that I, as a glasses-wearer, no longer have to squash my face as close to the viewfinder as possible.

Again you can check out my in-depth thoughts on the in-camera upscaling and denoising on our website, but if you find that a bit TLDR (Too Long, Didn't Read!) I can confirm they're both ridiculously good and I think they are going to transform the way we think about resolution and ISO sensitivity in cameras from here on in.

It's also worth remembering all this incredible AI tech is inside a very-manageable sized Canon EOS 5-series body. The R5 Mark II feels reassuringly comfortable to control, with the dials and buttons all in





Canon



Canon



Canon



Canon

familiar places, and the body didn't ever feel overly heavy to use, when we were shooting with the RF 24-105mm F4L and RF 24-70mm F2.8L lenses for extended periods. The R5 Mk II isn't actually much larger or heavier than the R6 Mk II, with the former at 138.5 x 101.2 x 93.5mm and 746g, compared with the latter at 138.4 x 98.4 x 88.4mm and 670g. Impressive stuff.

The only minor criticism I have of the camera right now – and bear in mind I was using a prototype

Canon wildlife pro photographer Robert Marc Lehmann could use the R5 Mk II's Eye Detection AF to focus on the eyes every time

The new Eye Control AF is twice as good as in the older EOS R3



camera running beta firmware – is that I experienced some minor banding when shooting with the electronic shutter in extremely low light conditions, where the scene and subjects were lit exclusively with pulsating nightclub spotlights. This may well be a sync/flicker issue, as I didn't have time to do much set-up before the performance started, but I could see the result in some breakdancing photos that I captured. It's hardly a problem, but I'll be keen to see if I can replicate the phenomenon in the real world with a finished production model.

Note: These images were shot on pre-production Canon EOS R5 Mark II beta sample models, final image quality may vary



PhotoPlusVERDICT

PROS: 180MP In-Camera Upscaling, 8K 60p RAW video, 30fps burst shooting, Predictive AI autofocus

CONS: Some banding in tough light, Upscaling for JPEG/HEIF only, noise reduction function is fiddly

WE SAY: The Canon EOS R5 Mark II does exactly what I want it to do. Which is everything the original R5 did – just bigger, better, more. 180MP In-Camera Upscaling and 2-stop Denoising, faster 30fps burst speed, 8K 60p RAW video, C-Log2, killer AI-powered predictive autofocus, reduced rolling shutter, Eye Control AF, 8.5 stops of image stabilization, pre-capture for stills and video, Smart Controller, Multi-Function Shoe, full-size HDMI port... and priced comparatively competitively. Quite simply, this is Canon's ultimate camera.

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★★



CANON EOS R1

With revolutionary AI features and killer autofocus, the R1 is now the best sports camera in the world, says **James Artaius**

The Canon EOS R1 is the camera I've been waiting for since the entire EOS R System was launched back in 2018. What is a camera system without a flagship? A top-of-the-tree standard-setter to showcase the Canon system and provide all the trickle-down goodness for the next half-decade.

I've reviewed every top-tier pro sports camera from every camera manufacturer – and after countless testing hours with the R1, 3500+ photos and endless 240p video, I can safely say the Canon EOS R1 is the best flagship sports camera on the market.

As you may know, it has a whole lot of tech in common with the new Canon EOS R5 Mark II – but the R1 has plenty of USPs that make it the obvious and indispensable choice for professional shooters. Now both cameras are available to buy, after a few months of waiting. Let's take a closer look at the EOS R1...

New AI features

The Neural Network Image Processing features in this camera are arguably even more important here than they are in the R5 Mark II. A combination of deep learning and algorithmic AI is used to power In-Camera Upscaling, which transforms the pedestrian-resolution 24.2MP images into pixel-packed 96MP photos – immediately outclassing every

The EOS R1 is the flagship camera of Canon's EOS R mirrorless system

The R1 features a new Action Priority mode for sports, with presets for Soccer (football), Basketball and Volleyball: this can identify the subject based on the action, helping you predict what is coming next



full-frame camera on the market, and effectively hitting GFX and Hasselblad territory.

On top of that is High ISO Noise Reduction, which uses AI to denoise images by two stops. It works wonders when you're pushing those higher ISOs, which are already way cleaner than you'd expect thanks to the flagship image sensor and modest pixel count.

It's easy to dismiss these features as a gimmick, but trust me: they're not. All of a sudden, your 24MP sports camera packs all of the resolution of a massive medium format sensor with raised ISO ceilings to boot. I believe these in-camera AI features are going to change everything (we went over the process involved in converting your files and show sample images so you can see real-world results on digitalcameraworld.com).

Hit the Accelerator

I didn't think that Dual Pixel CMOS AF could get any better, but Canon has upped the ante by adding a dedicated DIGIC Accelerator processor that fires in tandem with its newest DIGIC X image processor. The result is Dual Pixel Intelligent AF, the levelled-up evolution of Dual Pixel that can make AF and tracking computations at up to 60fps when you use the electronic shutter.

This makes all manner of magic possible, including the new Action Priority mode for sports with a circular ball (the camera is pre-programmed with modes for Basketball, Soccer and Volleyball). This mode has been schooled with deep learning AF to recognize, detect and track the body mechanics of players when a ball is in the frame.

This means that it can recognize when a footballer jumps up for a

// The Canon EOS R1 is the best flagship sports camera on the market //



the camera will register that person's face (in fact, it will somehow even register their profile as well). You can register up to ten faces, and the R1 will automatically focus on one of them as soon as they enter the frame.

But what happens if two, or three, or even all ten of your Registered People are in the frame? This is where the Priority comes into play. When you've registered your faces, you assign them a priority.

You can make the star player in a game the most important, and the bench warmer the least. Or the bride at a wedding is number one, and the rude uncle is number ten. If you want to photograph a band at a gig, you might want to prioritize the lead singer over the drummer.

When the camera recognizes more than one registered face, it will focus on the one with the highest priority until they disappear or unless you tell the camera otherwise – whether it's by flicking the joystick to another person or using Action Priority to prioritize a ball game.

I put this to the test during a basketball game as well. I had prioritized the player pictured shooting the ball, and as you can see he was being swarmed by a defender, obscured by two teammates, and a spectator repeatedly walked in front of my camera. And still, the camera knew where he was and that he had the ball, and wasn't tricked into jumping focus to anyone else.

This kind of genuine subject-tracking stickiness even with multiple moving obstacles – which many AF systems are so quick to promise – is rare as rocking horse poop. But in the EOS R1 it's made possible by the DIGIC Accelerator and Dual Pixel Intelligent AF cranking out all those calculations to never lose track of your target.

The EOS R1's intelligent AF modes make it easier than ever to focus on to player's eyes during the action

header, and calculate where the ball is likely to go next. It understands when a volleyball player leaps in the air and throws their arm back for a cross-court spike. And it even knows what is happening when two basketball players connect on an 'alley oop' in basketball.

I put this last one to the test myself, during a live three-on-three 'pickup' basketball game. It was a great test so I could see how the camera's AI focus mode knows to focus on the ball handler, and it doesn't get fooled when he lobs it up, over the head of the defence and above the rim, with focus following and shifting to his teammate who leaps in from out of frame to catch the ball in mid-air and jam it through the basket.

The clever autofocus functions don't stop there. There's Register People Priority mode that detects faces – but trust me, this ain't your daddy's face detection AF mode!

Simply take a photo of your subject – or even take a *photo of a photo* on their social media profile, if they're not in front of you – and

As you'd expect, the R1 has an LCD on the top in order to quickly check key exposure settings





Shooting basketball, side-on from the hardwood, is perhaps the best possible test of a subject tracking AF system – and the Canon EOS R1 aced the test easier than LeBron making a free throw!

No need for speed

Obviously we need to talk about frames-per-second shooting speeds. Ever since the Nikon Z9 and Sony A9 III pulled the 120fps card, expectations have been raised for Canon to offer the same furious frame-rate for its own flagship camera. And yet, the R1 doesn't fire 120fps, and it doesn't have a fancy global shutter sensor.

It does have a shiny new stacked sensor, with readout speed at just

The R1's rear controls will be intuitive to every Canon pro photographer, whether in horizontal or vertical format



2ms, resulting in 40% less rolling shutter than the Canon EOS R3, and with the first cross-type AF points in any full-frame camera for superior horizontal line detection (the R5 Mark II doesn't have this). But it 'only' maxes out at 40fps. The same speed as the entry-level EOS R8.

So, is this an admission of defeat? Hardly. Canon makes full-frame global shutter sensors – it's not like it couldn't use one if it wanted to.

But instead of going faster, Canon has actually gone slower. If you use the mechanical shutter, then the top speed is 12fps, but with the electronic shutter you can customize the speed down from 40, 30, 20, 15, 12, 10, 7.5, 5, 3, 2 and even 1 frame per second.

Canon's message is pretty clear. Professional sports photographers don't need 120fps; it's beginners and enthusiasts who need (want?) 120fps, because they don't know what they're doing and they need all the assistance that they can get. Matt Hoffman doesn't need stabilizers for his BMX, and pros don't need ridiculous frame rates.

Quite the contrary; pros are so good at what they do that even 40fps is overkill – all it's doing is filling their cards, cloud storage, and press agency servers with thousands more near-identical

The Canon EOS R1 is a cheat code for sports photography

CANON EOS R1 vs EOS R5 MARK II

	EOS R1	EOS R5 Mark II
Full-frame back-illuminated stacked sensor	24.2MP	45MP
Maximum continuous shooting bursts	40fps electronic shutter, 12fps mechanical shutter	30fps electronic shutter, 12fps mechanical shutter
Pre-continuous shooting rate	20fps	15fps
AF System	Cross-type AF with area 100% horizontal and vertical	100% horizontal and vertical with Face + Tracking and Auto
AF Points / Positions (for stills)	4368	5850
Highest ISO (Highest ISO expanded)	100-102,400 (409,600)	100-51,200 (102,400)
Fastest shutter speeds	1/8000 sec mechanical, 1/64,000 sec electronic	1/8000 sec mechanical, 1/32,000 sec electronic
Flash sync speeds (with electronic shutter)	Up to 1/400 sec	Up to 1/320 sec
Blackout-free EVF	0.64in OLED 9.44M dots	0.5in OLED 5.76M dots
Video	6K RAW video up to 60p	8K RAW video up to 60p
Battery grip	Built-in integrated vertical grip	Three battery grips sold separately
2.5Gbps Ethernet and FTP connectivity	In-camera	Via BG-R20EP/CF-R20EP battery grips sold separately
Prices body only	£6999	£4499



frames. What pros really need is the ability to choose fewer frames per second. And this is something I strongly agree with, as does just about every camera journalist and professional I've spoken with.

Pre-continuous shooting

Far more useful than additional frames after the fact are additional frames before it, which is why the EOS R1 now has a Pre-Continuous Shooting mode that starts capturing 20 frames when you half-press the shutter – so even if you don't fully press it until after the moment has already happened, you still get the shot even if you missed it.

The sensor also features a high-detail low-pass filter to improve resolution while reducing brightness moiré and colour moiré. It achieves this with the same specialized, quad-layer, 16-point sub-sampling with Gaussian distribution that debuted on the Canon EOS-1D X Mark III (which is the previous flagship camera), rather than the traditional dual-layer, four-point subsampling.

Elsewhere, as expected, the R1 inherits an improved version of the Eye Control AF system from the R3. An extra-large electronic viewfinder tracks the movement of your eye

The R1 uses the power of deep-learning to identify subjects, while its DIGIC Accelerator processor tracks and captures them more accurately than ever

With Register People Priority mode, you can log a face or faces, and the R1 will automatically focus on them as you're shooting

with infrared LEDs and a control sensor, enabling you to move your focus point around simply by looking at your subject – then half-pressing the shutter to lock. The new system boasts double the detection frame rate and a hugely increased detection range – and even wearing glasses, I found it fantastic to use.

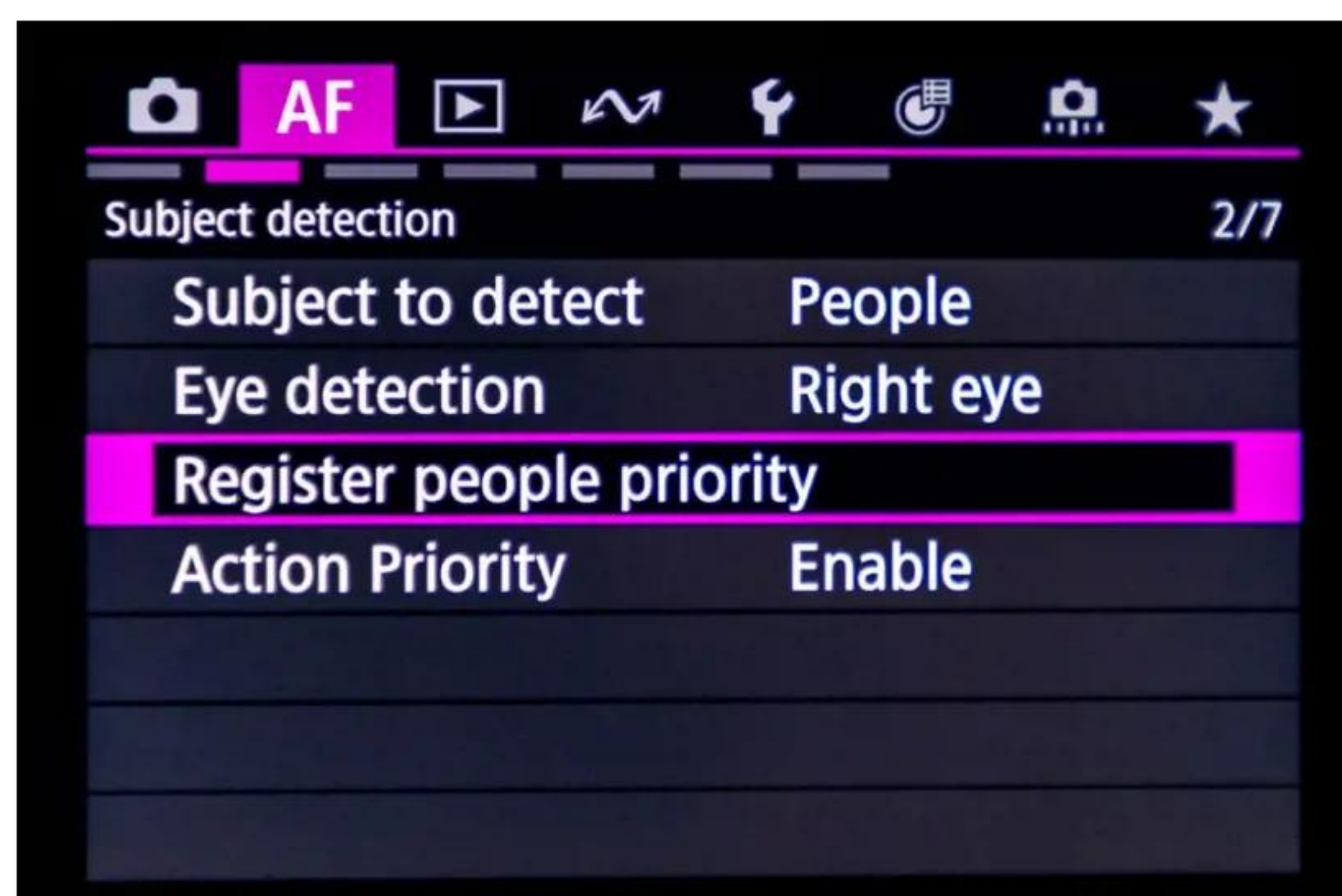
The R1 also has a new two-stage AF-ON button to activate two programmable functions within one button, as Canon says, "Allowing photographers to quickly respond to changing action in front of them."

Crucial for professional use is the suite of connectivity options. The R1 is the first EOS camera to support Wi-Fi6E/11ax 6GHz in-body, unlocking new levels of transfer speed, along with 2.5Gbps Base-T ethernet, which makes it the fastest network camera on today's market. The R1 automatically switches between wired and wireless connection, for seamless transition when you plug or unplug the cable, and with FTP multi-thread and a default FTP button during some playback functions, it's unparalleled for high-speed, high-performance file transfer.

Video king?

Let's talk about video. The Canon EOS R1 boasts internal 6K DCI RAW up to 60p, 4K DCI and UHD up to 120p, 2K DCI and FullHD up to 240p, and 35mm/APS-C crops for 4K DCI and UHD 120p, and 2K DCI and FullHD up to 120p. And best of all, the high frame rates now capture audio as well.

A slew of Cinema EOS-friendly features are present, including ProRes RAW with Atomos devices,



CANON EOS R1

SPECIFICATIONS

SENSOR 24.2MP back-side illuminated full frame stacked CMOS sensor

LENS MOUNT Canon RF

AUTOFOCUS Dual Pixel Intelligent AF cross-type, 4368 AF points stills / 3354 AF points movies

IMAGE STABILIZATION Up to 8.5 stops centre with IS lens (7.5 stops in corners)

ISO RANGE 100 to 102,400 (exp 50 to 409,600)

VIDEO 6K 60p, 4K 120p, 2K 240p, FullHD 240p

VIEWFINDER 0.64-inch OLED, 9.44 million dots, 120 / 60fps, 0.9x / 0.8x / 0.7x magnification, Eye Control AF

LCD 3.2-inch touch TFT, 2.1 million dots

MEMORY 2x CFexpress Type B (up to 2TB) cards

MAX BURST 40fps electronic (500 JPEG or 230 RAW), 12 fps mechanical (1,000+ JPEG or 1,000+ RAW)

CONNECTIVITY Wi-Fi (6G / 5G / 2.4G), Bluetooth, USB-C, HDMI, ethernet, microphone, headphone, N3 remote terminal, PC sync output, GPS, Multi-function Shoe

SIZE 157.6 x 149.5 x 87.3mm

WEIGHT 920g body only / 1115g with card and battery

PRICE (RRP) Body only £6999 / \$6299

Canon Log 2 and 3/HLG support, LUT support, Custom Picture support, 4-channel/24-bit audio, News ML – G2 metadata support, and a host of other goodies – including a full-size HDMI port and tally lamp.

Like the R5 Mark II, the R1 has a heat-dissipating design to draw heat away from the interior, with an aluminium sheet separating the memory card slot and CMOS sensor and engine, each of which have their own graphite sheet to dispel heat to the exterior of the body.

This, combined with the inherently better heat management due to the overall bigger body, produces pretty robust recording limits before overheating kicks in.

Four years in the making

It's been four years since the launch of the last EOS 1-series camera – the EOS-1D X Mark III back in Feb 2020.

I guess it doesn't feel that long because we got the EOS R3 at the end of 2021 – which was the de



facto flagship in the EOS R lineup, and was close enough to a 1-series camera that many were happy with it. Make no mistake, the R3 is a ferocious camera and a damned fine pro tool – but it's not the R1. Canon camera technology has moved on *a lot* since 2021.

From the improved image stabilization and Eye Control AF to auto-network switching and the anti-fog eyepiece, the new joystick and new button layout to the remote rebooting and ProRes RAW recording, all the way through to the fact that there's no plastic in the packaging, this is a more capable camera than the R3 in every way.

You can read our separate article (search on digitalcameraworld.com) which discusses In-Camera Upscaling and Denoising in more depth – innovations which are both

The R1 body is a new magnesium alloy and polycarbonate with glass fibre, that's dust- and water-resistant

Eye Control AF detects where you're looking through the viewfinder to automatically move AF points on the subject you're visually focused on



unreasonably good and that I truly believe will reshape the way we look at resolution and ISO performance in cameras.

In a nutshell, with the in-camera upscaling, the R1 has just solved the dilemma of having the 24MP sweet spot for sports shooting (6000x4000 pixel images), while also having the flexibility to photograph in medium

format resolution (96MP and 12000x8000 pixel images) – so do you really need a second body for hi-res imaging now?

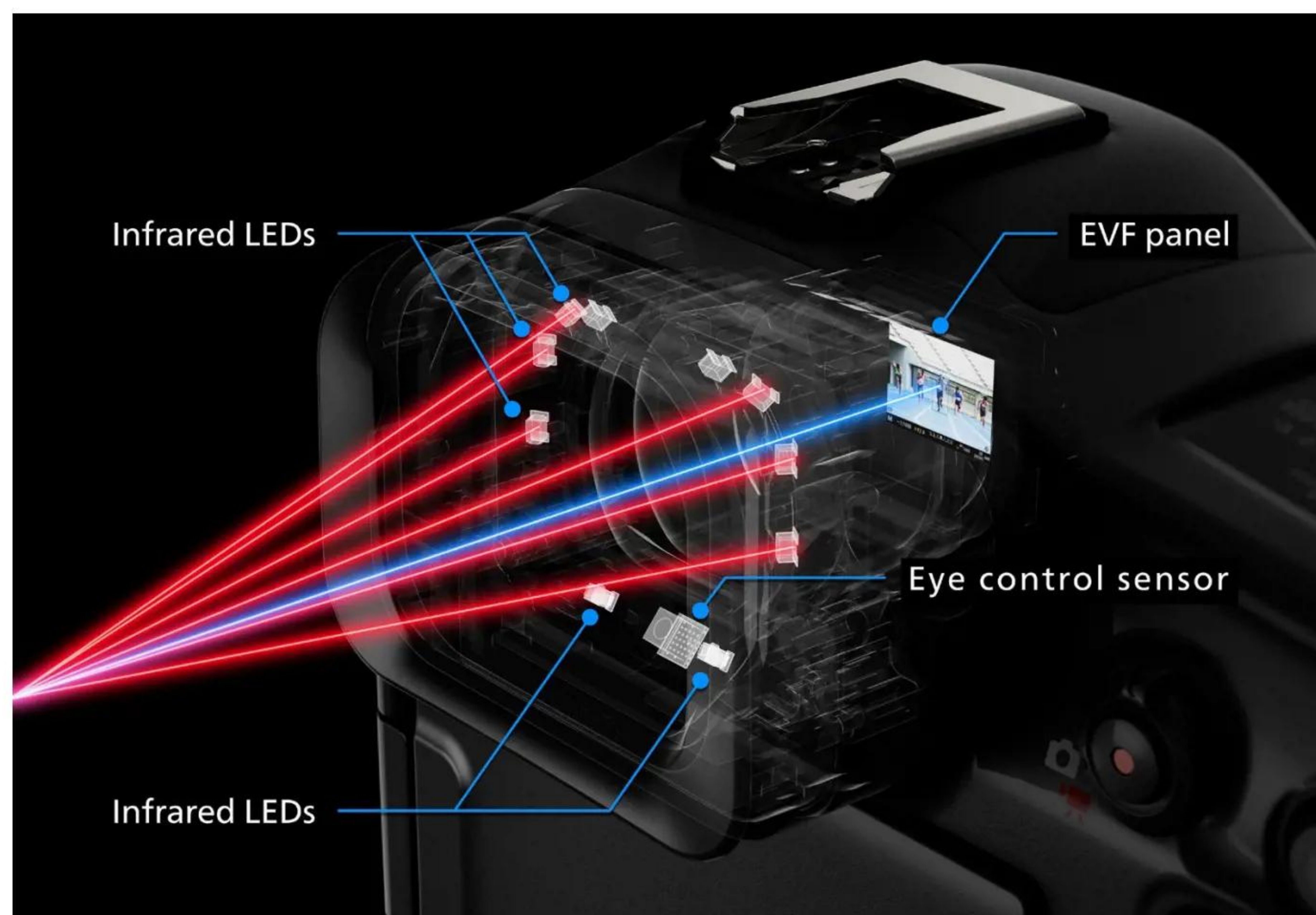
Fast AF!

If you hadn't guessed by now, the new autofocus functions are just out of this world. This camera simply didn't miss a beat when I tested it – not a single incident of focus hunting, no focus drifting onto random patterns in the background or suddenly jumping to a knee instead of a face or another subject entirely. This is as trustworthy as a personal focus puller.

I only have two minor criticisms. The first is something I also experienced on the R5 Mark II – and I should say these were prototype cameras with pre-release firmware. But I did get some minor banding issues while shooting some breakdancers, using the electronic shutter at high speed when performing their routines (they were lit only by pulsing FX lights).

It was hardly a major issue, and may simply be the fact that I didn't turn on anti-flicker or check that my camera frequency was synced to the right Hz.

Another great feature on the R1 – and another nod to the AI-infused





What if you don't shoot sports full-time? The equally-excellent R5 Mark II shares many of the brilliant new AI focus features you get in the R1, and may be all you need in a camera – and it costs £2500 less. While it's true the R1 trumps the R5 Mark II in almost all specs across the board (see table on previous page), the differences may not be significant for you, nor radically improve your photography. It all depends on what you mostly photograph and your priorities. 📸

PhotoPlus RATINGS

PROS: 96MP in-camera upscaling, 40fps burst shooting, Predictive AF tracking, 6K 60p with Canon Log 2, rapid AF
CONS: Only upscales JPEG/HEIF, some specs aren't significantly better than the cheaper R5 Mark II, very expensive

FEATURES



BUILD & HANDLING



PERFORMANCE



VALUE



OVERALL



capabilities of the camera – is Blur / Out-of-Focus image detection. But I simply couldn't get it to detect any blurry images! What I will say with hand-on-heart honesty is that not a single one of the 3525 images I took were out of focus. Which speaks to the brilliance of the AF system.

So I took three more images of my face, with a slow shutter speed and shaking my head side-to-side, to create artificially blurred shots – and still, the blur detection didn't flag them up. This may be a case of user error, but I'd love to see this feature tightened up (or explained to me) as anything that helps crop the non-keepers has got to be good – even if there aren't many naturally occurring ones!

By using the AI AF modes at your finger tips, the R1 will focus on your subjects, however challenging the shot may be

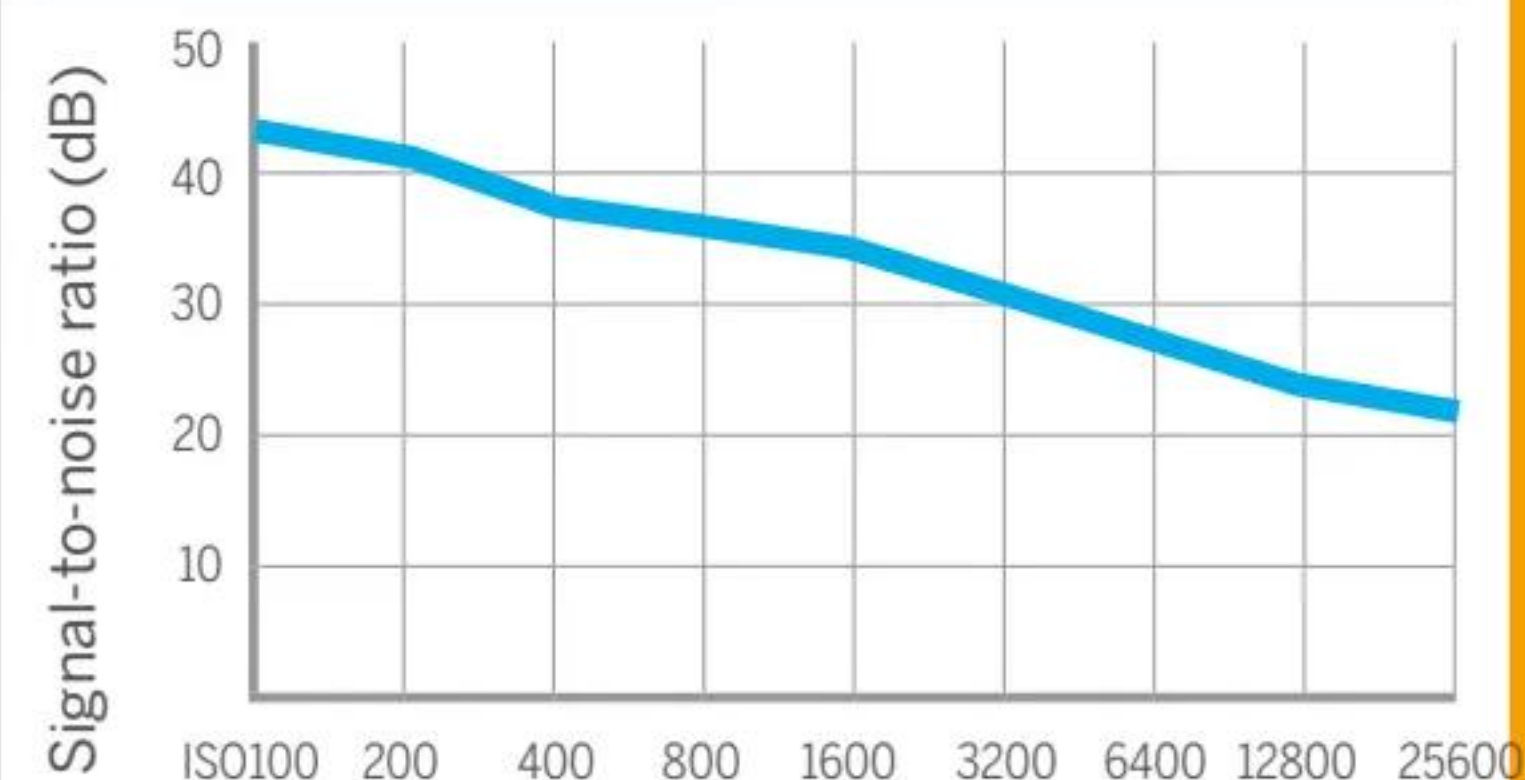
The R1 is the first EOS 1 series pro camera to have a Vari-Angle screen, ideal for shooting from all positions



CANON EOS R1

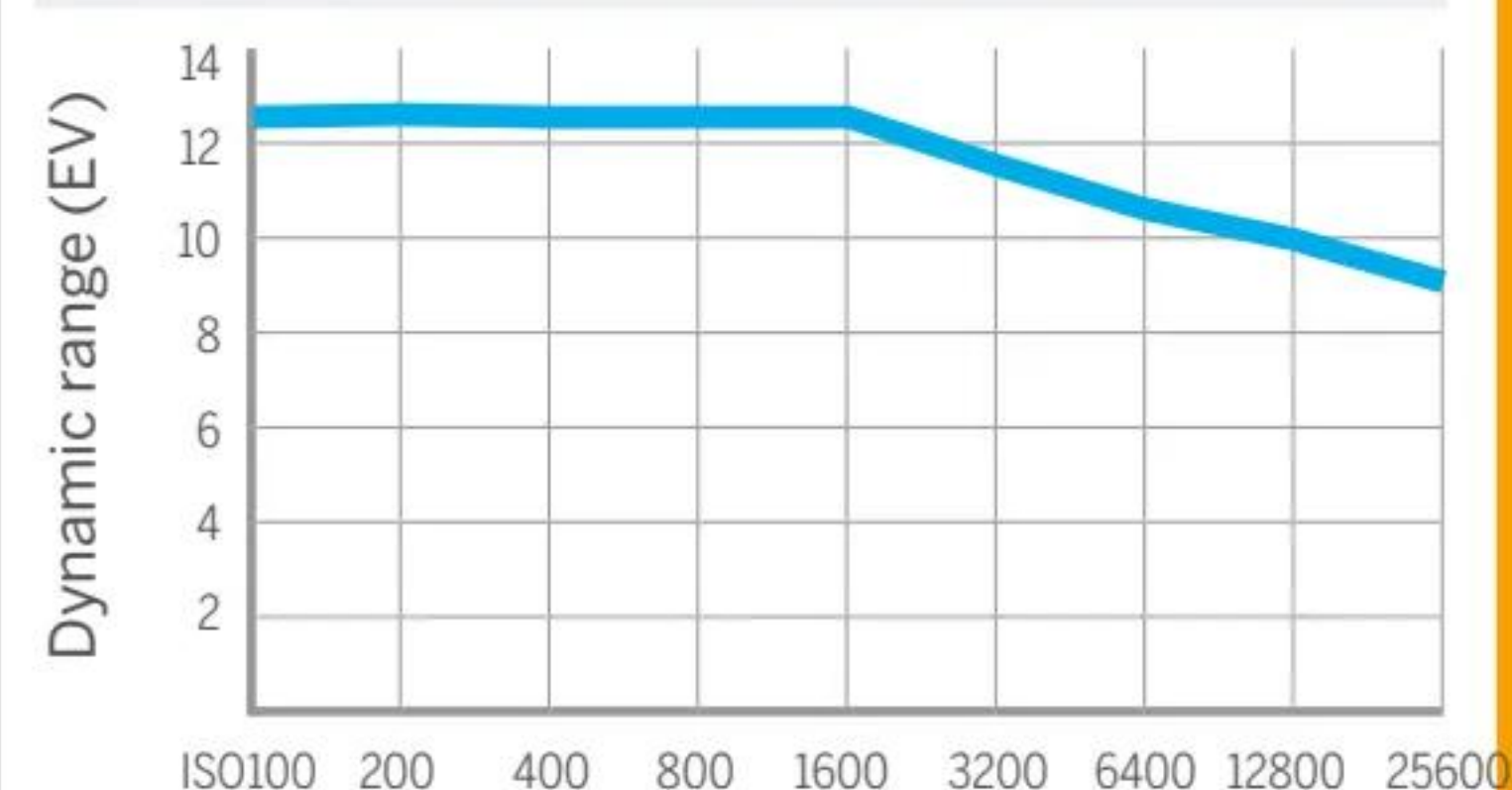
EOS R1 LAB RESULTS

RAW* SIGNAL-TO-NOISE RATIO



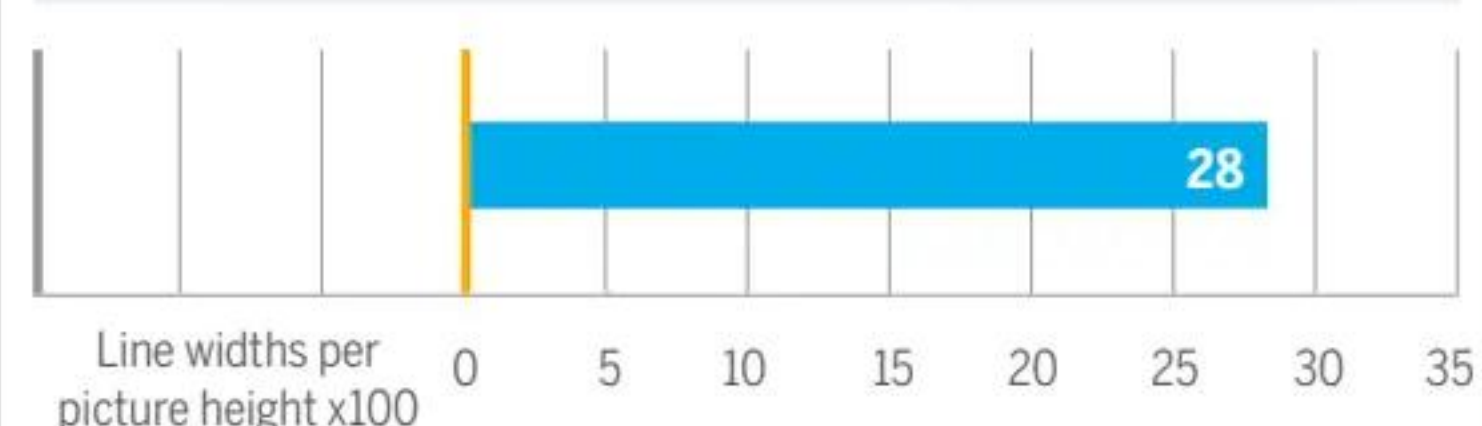
Noise levels are consistently low, especially at higher ISOs where the EOS R1 produces particularly clear images

RAW* DYNAMIC RANGE



Dynamic range is the EOS R1's forte: it's good at low sensitivities, but class-leading at ISO1600 and above

RAW* RESOLUTION (AT ISO200)



The EOS R1's resolving power is typical for a 24MP camera, and matches the likes of the Sony A9 III

FINAL VERDICT

Does Canon's super-fast flagship live up to expectations?

The EOS R1 is built like a tank, with shooting performance to match. I shot more than 3500 images on a camera I'd never used before and I got a 100% hit rate while photographing sport. Basketball, at that, which next to combat sports might be the trickiest of all for a camera to shoot. That's the best endorsement I can give the Canon EOS R1.

For all the AI bells and high-tech whistles, for all the amazing algorithms, you don't need to understand any of it: this camera just plain works. You point it at your subject, it makes sure everything is in focus, and you can just get on with taking great images.

Whereas the original EOS R5 was a cheat code for wildlife photography – the Canon EOS R1 is a cheat code for sports photography. It will make life easier for elite agency photographers and aspiring amateurs alike. And if you shoot basketball, football or volleyball, it's not "Should you buy an R1?" but when to buy one! (If you don't shoot sports, its similar sibling R5 Mark II may be all the camera you need.) Overall, Canon's latest flagship has been worth the wait. Other brands worked harder with burst rates, but Canon worked smarter – and the R1 is all the better for it.

FIND OUT HOW TO SHOOT YOUR BEST PORTRAITS YET

Whether you're an enthusiast or an expert, this brand-new title will help you to master every aspect of portrait photography, from kitbag essentials and core techniques, to how to get creative in your shoots



**ON SALE
NOW**



Ordering is easy. Go online at:

magazinesdirect.com

Or get it from selected supermarkets & newsagents

ON SALE NOW!

THE WORLD'S FAVOURITE PHOTOGRAPHY MAGAZINE



Take your camera skills to the next level with
the world's leading magazine for DSLR & CSC users

BUY AN ISSUE OR SUBSCRIBE

Including video tutorials and camera settings cards

Get the new issue at www.bit.ly/buydcam

Also available on your tablet or phone!





HÄHNEL MODUS 600RT WIRELESS KIT

A fully-featured, pro-grade wireless RF flashgun kit – for less than half the price of the Canon own-brand equivalent

The new Hähnel Modus 600RT flashgun looks very similar to Canon's range-topping Speedlite 600EX II-RT (£540/\$480). It's almost identical in terms of its features, control panel layout, size and weight. However, there are three major differences, one being that the Hähnel is much cheaper to buy. On its own, the Hähnel flashgun costs just £230/\$300, but that excludes the Viper RF transmitter,

which is included in the 'Wireless Kit' reviewed here, and is very much worth having. There's also a 'Pro Kit' (£450/\$585), which adds an extra flashgun for versatile dual-flash lighting setups.

Like Canon's 600EX II-RT, the Hähnel flashgun has a built-in RF transceiver, enabling it to work in wireless RF master/slave modes. However, it goes beyond the Canon's range of 30m to offer a full 100m. The addition of the Viper hotshoe-

The Modus 600RT resembles Canon's 600EX II-RT, but piles on extra functionality

mounted trigger, with its on-board controls and LCD display, enables you to use the flashgun off-camera in RF wireless mode. To do this with the Canon flashgun, you'd need to buy an additional ST-E3-RT trigger (£240/\$285) or a second flashgun (a 600EX II-RT or a 430EX III-RT).

The final big difference is that the flashgun is powered by a rechargeable lithium-ion battery pack, instead of four AA batteries. This gives far greater stamina, up to 550 full-power flashes between recharging; and recycling speeds that are about twice as fast as with the Canon, at 1.5 seconds after a full-power flash and just 0.7 seconds after a half-power flash.

For most other features, the Hähnel goes toe to toe with Canon's flagship flashgun. It has a motorised zoom head with a 20-200mm range (effective focal length), with a

HÄHNEL MODUS 600RT WIRELESS KIT



SPECIFICATIONS

MAX GN Gn 60 (200mm)
BOUNCE (DEGREES) -7 to 90 degrees
SWIVEL (LEFT/RIGHT) 180 / 180
ZOOM RANGE 20-200mm (auto)
WIDE-ANGLE DIFFUSER 14mm
REFLECTOR CARD Yes
AUTO METERING E-TTL / E-TTL II
FLASH EXPOSURE COMP +/-3EV
MANUAL POWER SETTINGS 1/1 to 1/128
AF-ASSIST BEAM Red lamp
WIRELESS Master/Slave IR/RF
ADDITIONAL MODES HSS, RC, Strobe
TTL FLASH EXP ERROR OEV
FULL POWER RECYCLE 1.7 seconds
FLASH INFO LCD Mono backlit
ACCESSORIES Pouch, stand, charger
DIMENSIONS (WxHxD) 64x76x190mm
WEIGHT 430g (540g inc battery)
TARGET PRICE £230/\$300

flip-down 14mm wide-angle diffuser and pull-out catchlight/bounce card. It has the same maximum power rating of Gn 60 at the 200mm zoom setting, and a full complement of advanced flash modes, including high-speed sync, rear curtain and programmable

strobe (with multi-flash support during a single exposure).

The only minus points are that the Hähnel lacks the Canon's weather-seals, and there's no locking mechanism for the bounce and swivel head. There's also no firm click step between the bounce positions of -7 and zero degrees. On the plus side, you do get a full range of bounce angles between -7 and 90 degrees, and complete 360-degree swivel rotation.

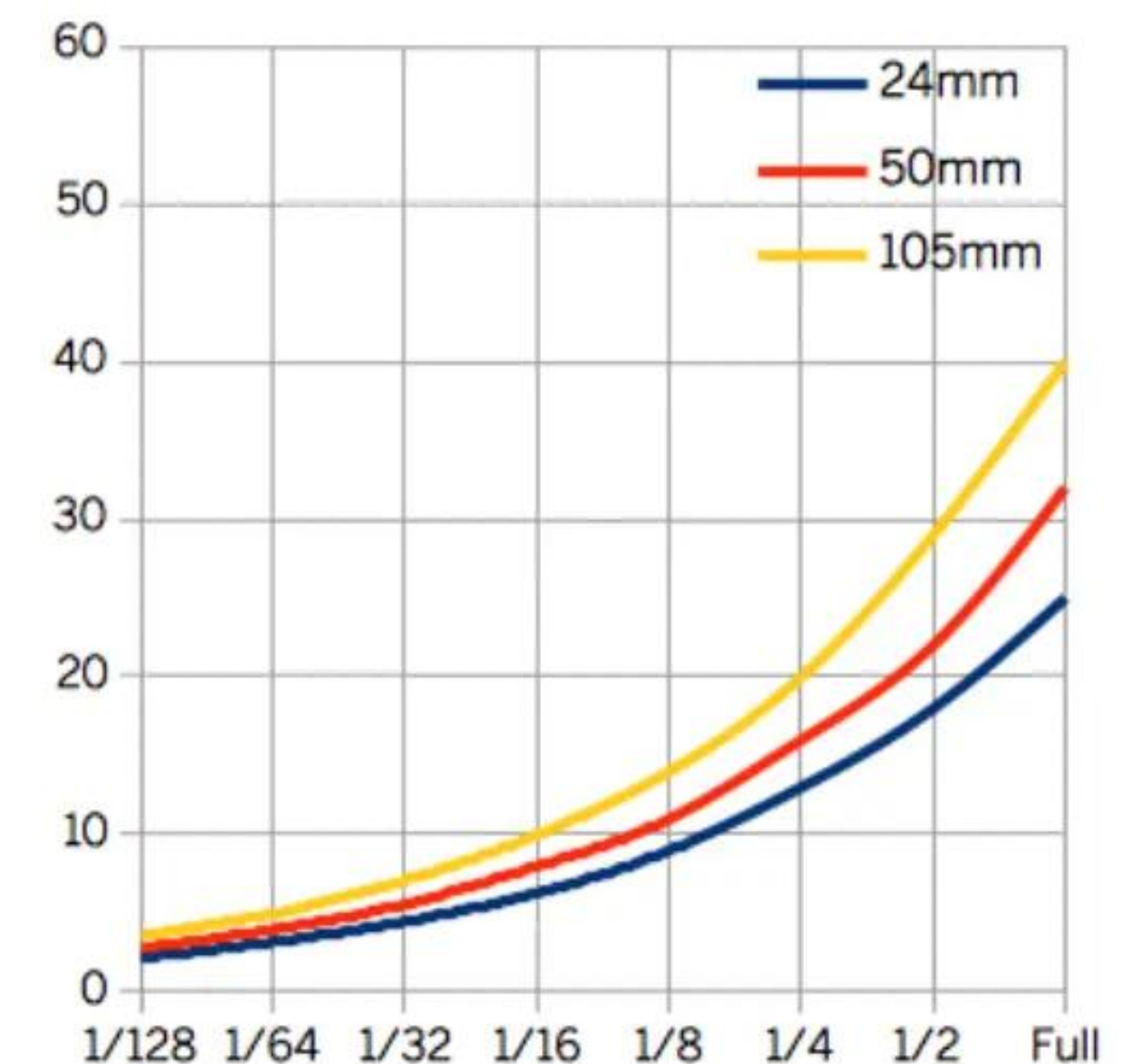
Performance

In operation the Hähnel performs flawlessly, firing from the hotshoe and in off-camera mode with the RF wireless Viper transmitter. You'll need optional Viper receivers (£60/\$80 each) to enable Canon or other makes of flashgun to join the RF wireless party, but optical master/slave operation works straight out of the box with Canon cameras and flashguns that support this more basic mode of wireless linking. TTL flash metering is very accurate and entirely consistent, and the flashgun lives up to the company's claims for impressive power output. **PP**

FEATURES

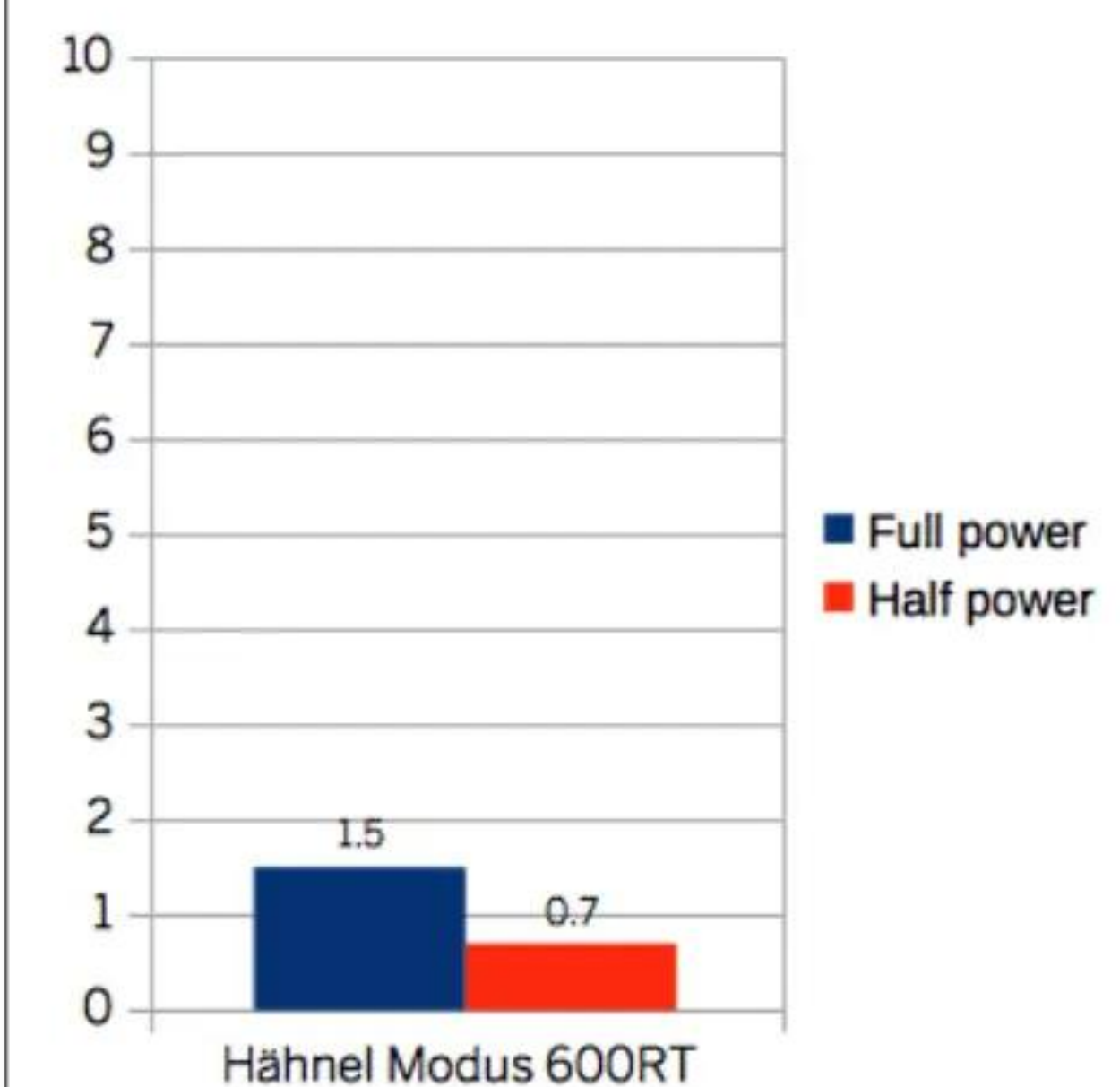
- 01 The bounce & swivel head has a 20-200mm zoom range.
- 02 Side connections include a sync terminal and a USB port for applying firmware upgrades.
- 03 Context-sensitive control buttons are intuitive, linking to menus on the backlit mono LCD.
- 04 If you need one, an additional Hähnel HLX-MD1 Extreme Li-ion battery costs around £45/\$60.
- 05 Unlike the Canon 600EX II-RT, the mounting foot doesn't have a weather-seal shroud.
- 06 Optical master/slave transmission works at up to 15m, but RF (Radio Frequency) wireless mode reaches 100m and can pass through obstacles.

POWER OUTPUT



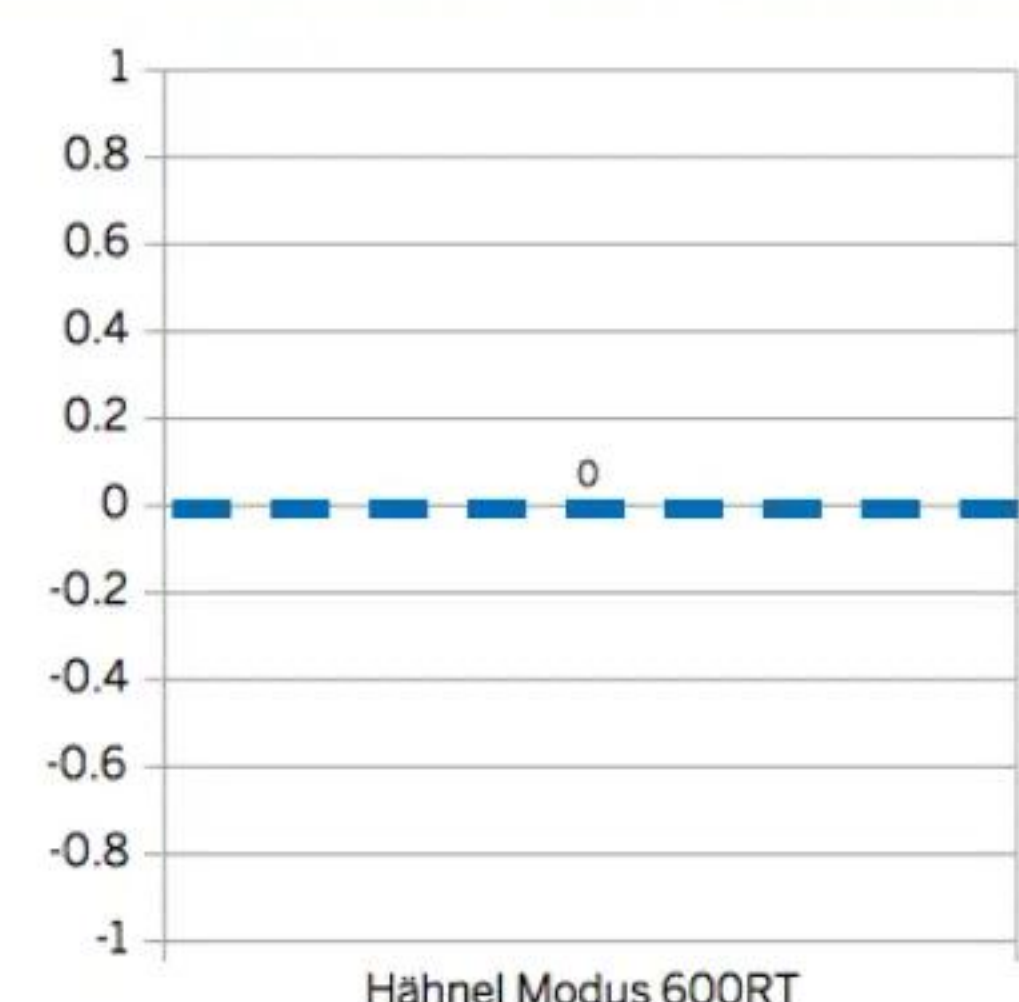
Measured maximum power output is marginally down on the Canon 600EX

RECYCLE SPEED



The Hähnel recycles after a full-power flash in under half the time of the Canon

TTL ACCURACY



Electronic TTL (Through The Lens) flash metering proved unerringly accurate

VERDICT

The build quality isn't quite a match for Canon's flagship flashgun, but the Hähnel works a treat on- and off-camera, backing up its extensive top-end features with superb performance and intuitive control.

FEATURES

★★★★★

BUILD & HANDLING

★★★★★

IMAGE QUALITY

★★★★★

VALUE

★★★★★

OVERALL

★★★★★

Bounce flash



Bounce flash, when the flashgun is on the camera, can give fairly soft lighting for a conventional look

Off-camera flash



Off-camera flash, on the other hand, enables creative placement for more dramatic effects

Photo backpacks

Get the ideal sub-£100 full-photo backpack for safely stashing all your Canon gear

CAMERA bags come in all shapes, sizes and styles these days, ranging from traditional shoulder bags, through messenger bags, to backpacks and hard cases. Backpacks themselves are available as split photo/daypacks with a dedicated compartment for carrying a select amount of camera gear, and a second compartment for stowing personal paraphernalia.

In this round-up, we're focusing on 'full photo' backpacks, which have a single main compartment that occupies the whole height of the bag. This creates

a more generous space for carrying a DSLR with a lens attached, a few alternative lenses, a flashgun and other photographic accessories. Adjustable dividers with Velcro fasteners enable you to tailor the fit to suit your kit.

Some full photo backpacks are big, bulky and heavy, even when empty. They can be very pricey as well. We've chosen six backpacks that are reasonably lightweight and easily manageable, while still being able to hold plenty of gear. We've also opted for regular styles that have two shoulder straps, rather than one, thus spreading the load for comfortable carrying. **PP**

FIVE THINGS TO LOOK OUT FOR

Make sure your prospective purchase ticks all the right boxes to suit your individual requirements in a camera backpack

01 Sky's the limit

If you're flying, you might like to take your camera kit as cabin luggage. All of the backpacks in this group are within standard size limits, but keep an eye on weight restrictions, which vary greatly between airlines.

02 Buckle up

The lightweight Manfrotto 'Advanced Gear' is the only backpack in the group that doesn't have a waist strap for added stability. The rest of them, apart from the two Lowepro bags, also add a chest strap, which helps to stop the mains straps from slipping off your shoulders.

03 Extra space

Some backpacks feature additional small compartments or pockets, for stowing anything from small personal items to tablets or laptops.

04 Tripod attachment

All of the backpacks on test have a facility for securing a tripod, enabling easy, hands-free carrying.

05 Cover-up

As well as having a shower-proof construction, all of these backpacks are supplied with a slip-over, rain-proof cover. In the Hama and Lowepro bags, the cover folds away into a cavity at the bottom.

Hama Daytour Camera Backpack 180

£65/\$100 www.hama.com

★★★★★

HAMA HAS packed a lot into a compact backpack, with internal dimensions of 27x18x32cm, although it's shallower at the top. Adjustable dividers enable up to ten separate sections. There are two side compartments (one with a bottle carrier), but no tablet or notebook compartment. Small pockets are labelled for fresh and used batteries and memory cards alike, and there's a larger pocket and mesh enclosure too.

Access to the main compartment is from the rear. This adds security, as well as avoiding the surface you wear against your back getting mucky when you lay the bag down. There's also top-opening access, for easily grabbing your camera.



VERDICT

PROS: Colour-coded battery and card pockets; rear and top access

CONS: A little cramped; no tablet or laptop compartment

WE SAY: A great buy, but check the dimensions will fit your gear

Manfrotto Advanced Gear Backpack Large

£89/\$120 www.manfrotto.co.uk

★★★★★

SHORT AND shallow, the main compartment isn't exactly 'large' at 25x12x40cm, and there are only enough dividers for six separate sections. Front opening is via the usual double-zipper arrangement, and the full height of the flap's inner surface is given over to two zipped mesh pockets.

The main compartment is really only half of the story. An additional front compartment, also accessible via dual zippers, runs the full height of the bag and is deep enough to take an array of personal items, or even a laptop. The front compartment contains an additional zipped mesh pocket and two padded pockets. There's even an extra, external zipped pocket on the front of the bag, and a pocket on each side.



VERDICT

PROS: Voluminous secondary compartment for personal items

CONS: Shallow main compartment compared with other backpacks

WE SAY: Good if you want to pack personal stuff as well as camera kit

Lowepro Flipside 400 AW

£85/\$140 www.lowepro.co.uk



NOTICEABLY taller than the Hama, the Flipside's main internal area measures 27x15x42cm. There's enough of a difference to squeeze in a couple of extra lenses, and moveable dividers allow up to eight sections. It's a rear-access bag but it lacks the Hama's top-access flap. Instead, there's a wide and well-padded waist strap, the idea being that you can slip the main straps off your shoulders and swivel the bag around your waist to access your gear, without having to lay the backpack down on the ground.

Pouches on both sides hold drinks bottles and the like, as well as a particularly good 'organiser' compartment that can be opened separately from the main compartment. The main section also features pockets for memory cards and other accessories.



VERDICT

PROS: Capacious but not overly large; rear access; good organizer

CONS: Chunky waist strap can make the bag feel cumbersome

WE SAY: Good for places where don't want to lay your bag down

Lowepro Photo Classic BP 300 AW

£99/\$120 www.lowepro.co.uk



MORE conventional than the Flipside, this has a front-opening design. The unpadded waist strap makes it look more compact but the main compartment is almost as large, with internal dimensions of 27x13.5x40cm. Adjustable dividers enable eight sections and there's a sleeve for stowing a tablet up to 10 inches. A separate organiser compartment is rather small, but a bungee cord criss-crossing the front enables additional stowage, which can be enclosed by the all-weather cover.

The main compartment has elasticated pockets for memory cards and a spare battery, as well as a zipped mesh pocket. Stretchy mesh pockets are fitted on each side of the bag's exterior.



VERDICT

PROS: Roomy interior; tablet sleeve; sleek-yet-robust build

CONS: No top or rear access without laying the bag down

WE SAY: Simple and compact, yet still offers generous room inside

Manfrotto Pro Light RedBee-210 Reverse Access

£99/\$180 www.manfrotto.co.uk



THIS IS larger and twice the weight of the other Manfrotto, at 1.6kg. There are still six sections, but with beefier padded dividers, the storage space is considerably bigger at 28x16x44cm. There are also dual internal sleeves for a laptop computer and tablet, plus additional internal pockets, all of which are sectioned off via a zipped mesh divider.

As well as featuring rear and top access to camera kit, as in the Hama backpack, the Manfrotto also enables access through zipped flaps on both sides of the bag. The arrangement makes it easy to get at your camera and attached lens and, say, a flashgun and your preferred additional lens, all without opening the main rear-facing cover.



VERDICT

PROS: Multiple flaps; rear-opening compartment; tablet/laptop sleeves

CONS: Bulky and considerably heavier than the other Manfrotto

WE SAY: Good for accessing kit without opening the whole bag

Nest Athena A81

£80/\$120 www.nest-style.com



WEIGHING THE same as the Lowepro Flipside and Manfrotto RedBee backpacks, at 1.6kg, the Nest isn't quite as bulky yet has the outright biggest camera compartment, at 30x18x44cm. Adjustable dividers enable you to set up as many as 11 separate sections, and the inside of the conventional front-facing main flap includes a sleeve for a laptop.

External pockets on each side include organisers for memory cards, batteries, pens and so on, and an additional front pocket gives storage space for further photographic accessories or personal items. The quality of construction is very good, similar to that of the other backpacks on test, making the Nest good value for money. It's also a particularly comfortable backpack to wear, even when packed to the brim with camera kit.



VERDICT

PROS: Roomy for large collections of photo gear, plus a laptop

CONS: Lacks rear, top or side access to the main compartment

WE SAY: For a well-made, roomy backpack, it's a bargain at the price

Sturdy tripods

Six sets of rock-solid legs compared, for when only the best camera support will do

We love a good travel tripod and the ability to get serious support from the least amount of bulk. But if you're packing a full-frame Canon DSLR along with fast and heavy glass, something stronger could be in order.

Beefier tripods are just the ticket for macro photography, where maximum rigidity is preferable to portability. They're also essential for wildlife work if you break out a hefty super-telephoto optic and mount it to an equally bulky gimbal head.

When it comes to heads, it's not uncommon to find that manufacturers don't always

bundle one with such high-end legs, as is the case with the Benro and Manfrotto tripods tested here. You're free to spec whatever you want, but we've gone for quality ball heads all round, to offer a good balance of support and compactness.

Finally, just because these are sturdier tripods doesn't mean they'll be back-breakers. Despite all our options topping 165cm when fully extended, their high-tech carbon fibre construction means even the heaviest of the six weighs in at a reasonable 2.5kg, while most are closer to 2kg, and some are lighter still.

FIVE THINGS TO LOOK OUT FOR

There's a lot more to a sturdy support than may initially meet the eye, so consider these top tips before you buy

01 Split decision

Three-section legs or four? Three cuts down on joints to reduce flex and improve rigidity, but four-section designs that stretch to the same tripod height usually pack up much smaller.

02 Weight it up

All the tripods here use carbon fibre to maximise stiffness and minimise weight. It's a pricey material though, and the Benro and Nest tripods also have cheaper aluminium alternatives.

03 Sure-footed

Even the strongest supports won't be much use if they can't grip the ground properly. Oversized rubber feet are good to have, as is the ability to fit spikes when on loose surfaces.

04 Top it off

A sturdy tripod needs a decent head. Large-diameter ball heads will help steady a big Canon setup, as will adjustable friction. Standard Arca-Swiss mounting plates are a must.

05 Fun frills

There's more to toughened tripods than rigid rods. Some can be converted to a monopod, while others boast vari-angle centre columns that flip out at all angles to assist with macro work.

Benro GoPlus Classic TGP27C + IB2 Head



£309+£94/\$410+\$120 www.benroeu.com



THIS NEW no-compromise design makes a big impression. It tops out at an imposing 178cm, and packs down to an equally unwieldy 73.5cm. That's due to the use of three-section legs, which should be more rigid than four-section designs. Factor the extra-large-diameter carbon tubing, capable of supporting a tidy 12kg, and you get the most solid-feeling setup here.

Total weight is 2.1kg, while useful extras include a monopod conversion, plus the Quick Flip centre column that pivots to almost any angle. There's a set of interchangeable spiked feet, while the optional IB2 head impresses with its friction-adjustable ball and sound ergonomics.



VERDICT

PROS: Excellent rigidity; monopod; pivoting centre column; quality head

CONS: Not a lot more rigid than the competition, but less portable

WE SAY: If don't need compactness, these legs shape up very well

Nest Traveller NT-6294CK Carbon Fibre Tripod/Monopod

£300/\$440 www.nest-style.com



THANKS TO legs that flip up to surround the head, this tripod packs down to just 45cm, yet the four-section legs and centre column extend to a respectable 166cm at full stretch. It tips the scales at just 1.85kg. The large-diameter eight-layer carbon tubes and twist-grip locks aren't quite as rigid as the Benro or Manfrotto legs, but they'll hold steady under a 5DS and 70-200mm f/2.8, even if the stated 20kg maximum load limit seems slightly optimistic.

Despite its modest price, you still get a monopod conversion, along with a head boasting friction control, two bubble levels and a fairly large 32mm-diameter ball. The only downsides are a centre column that won't pivot, and you can't add spiked feet.



VERDICT

PROS: Compact, yet solid enough for most situations; monopod

CONS: Ball head could be larger; basic centre column; no spiked feet

WE SAY: Combines sturdiness and portability at a reasonable price

Gitzo Mountaineer Series 1 Kit GK1542-82QD

£839/\$1000 www.gitzo.com



A 170CM maximum height is pretty lofty, yet these are the lightest legs on test, at just shy of 1.8kg, and the four-section carbon tubes step down to a mere 14.7mm diameter. But Gitzo's exceptional build quality, cutting-edge construction and rock-solid twist-lock extension clamps help the Mountaineer defy its size and stand strong.

Your money buys engineering, not features, however, as there are no extras like spiked feet or a trick centre column. The included ball head offers super-smooth movement, friction adjustment, and a 40mm-diameter ball capable of supporting 14kg, although the legs are rated for a more modest 10kg.



VERDICT

PROS: Superb quality; rigid for its size and weight; great ball head

CONS: Short on extra features; seriously expensive

WE SAY: A terrific tripod, but it's tough to justify its premium price

Manfrotto MT055CXPR04 + XPRO Ball Head

£279+£160/\$500+\$160 www.manfrotto.co.uk



THE 055'S Quick Power Lock leg extension clamps are easier and faster to use than twist-grip designs, and their positive locking helps make the four-section legs feel as rigid as most three-section rivals, compensating for a spindly 16mm minimum tube diameter.

The leg angle selectors aren't quite so ergonomic, and it's a pity there's no way to add spiked feet. At least you get a 90-degree centre column that can be rotated to sit horizontally, as well as a socket to mount accessories.

We paired the 055 with the equally solid XPRO Ball Head. It boasts a 40mm-diameter ball, superb precision and variable friction, though at 520g it takes the total weight north of 2.5kg.



VERDICT

PROS: Very rigid; class-leading leg locks; versatile centre column

CONS: Heaviest setup on test; no monopod conversion or spiked feet

WE SAY: There's a lot to like here, but the extra weight will keep you fit

Novo Explora T10 + CBH-40 Ball Head

£180/\$240 www.novo-photo.com



AS WELL as a detachable monopod, the Explora T10 comes with long and short centre columns for low-level shooting. The rubber feet can be removed to reveal spikes, while the included CBH-40 ball head is silky smooth, with a large ball diameter and variable friction. It's also unusual as you can rotate the camera mounting plate while the ball is locked.

Weighing in at 1.8kg means these legs rival the Gitzo as the lightest on test, and at 49cm long when packed, only the Nest compresses more. Four-section legs give a tall 171cm maximum shooting height, however their twist-grip extension locks – while holding steady – don't quite match the quality of rival designs.



VERDICT

PROS: Compact; decent rigidity; detachable monopod; spiked feet

CONS: Leg locks aren't the best; tricky to set head friction

WE SAY: Cheap, but doesn't match the quality of better-known brands

Vanguard Alta Pro 283CB 100

£300/\$370 www.vanguardworld.com



VANGUARD HAS opted to use three-section legs for added rigidity, increasing packed length to a bulky 72.5cm when fitted with the included SBH-100 ball head – creating a total weight of 2.15kg. It does, however, result in a handy 180cm extended height, and Vanguard's Multi-Angle Central Column helps with low-angle and macro shots.

Grippy rubber feet can be retracted to reveal spikes, while foam pads wrap the top of all three legs, and you can pivot the legs to 20, 50 or 80 degrees.

Twist-grip leg locks keep the eight-layer carbon tubes from compressing under an 8kg load capacity, but they allow a degree of lateral play, reducing the benefit of the three-section legs.



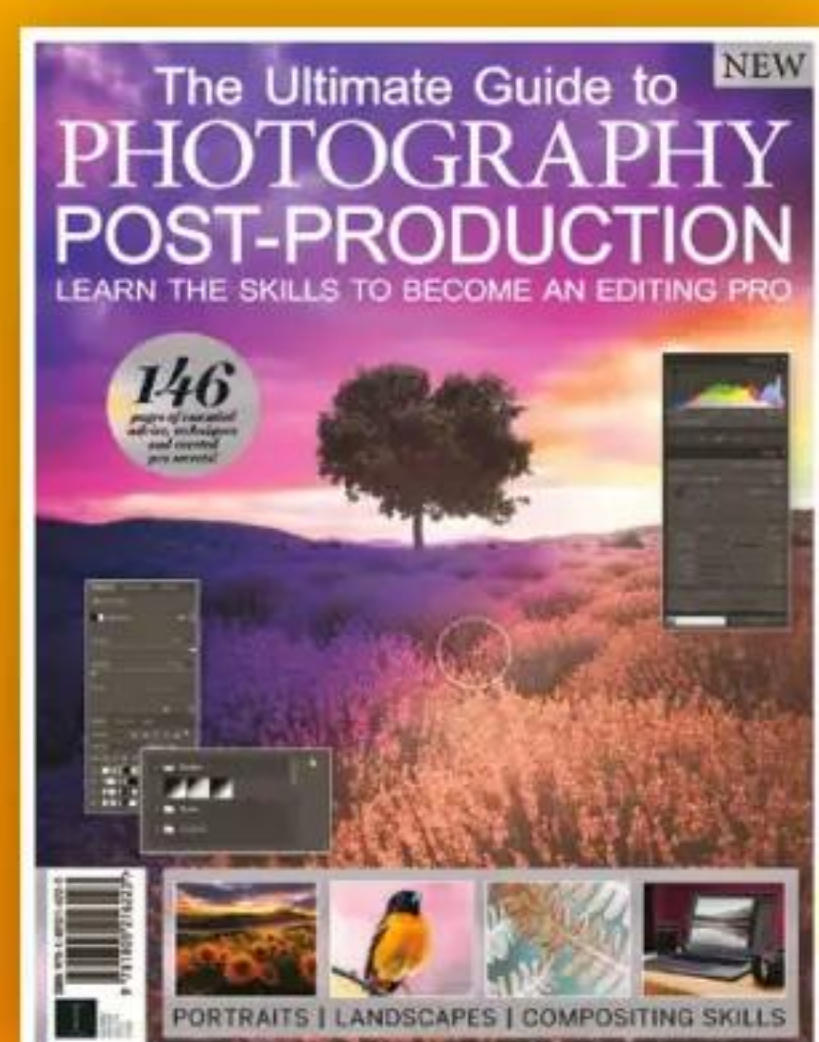
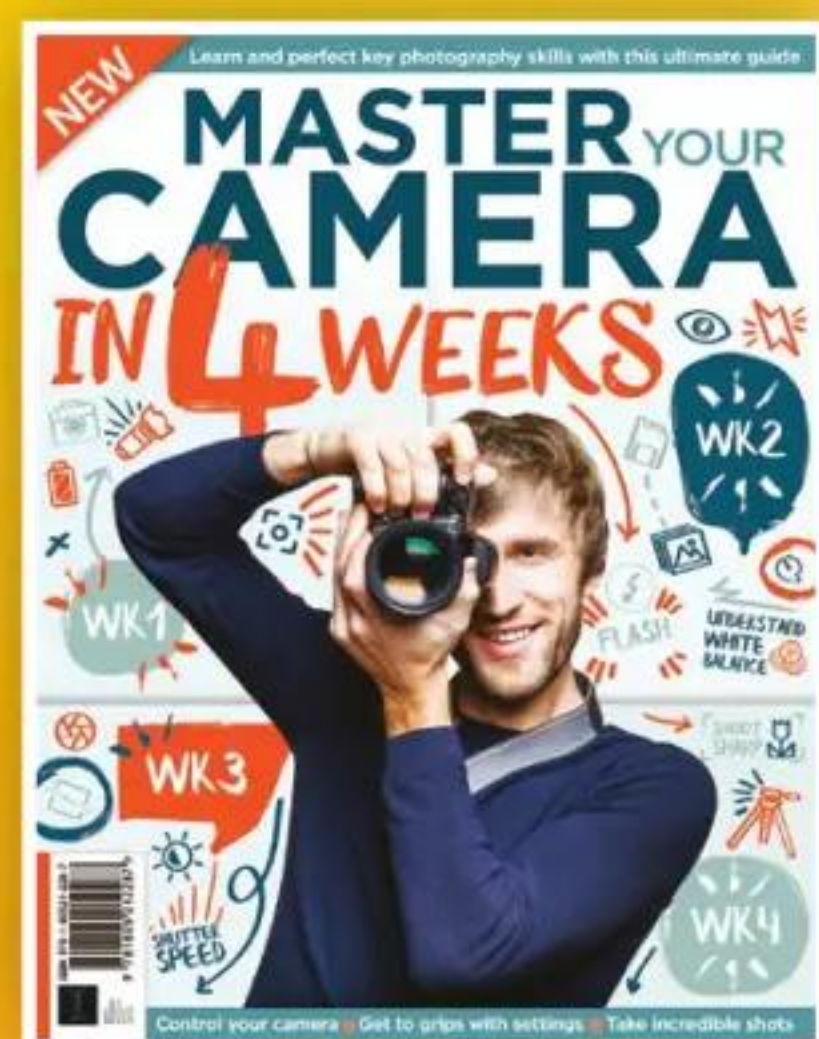
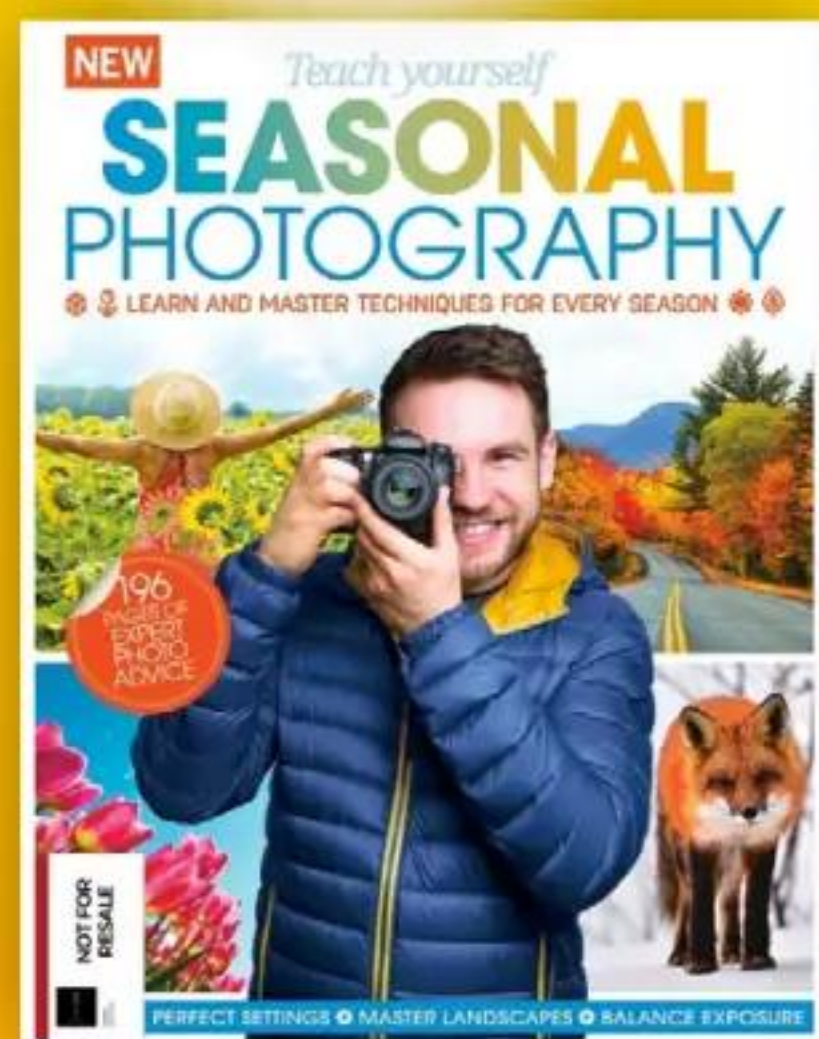
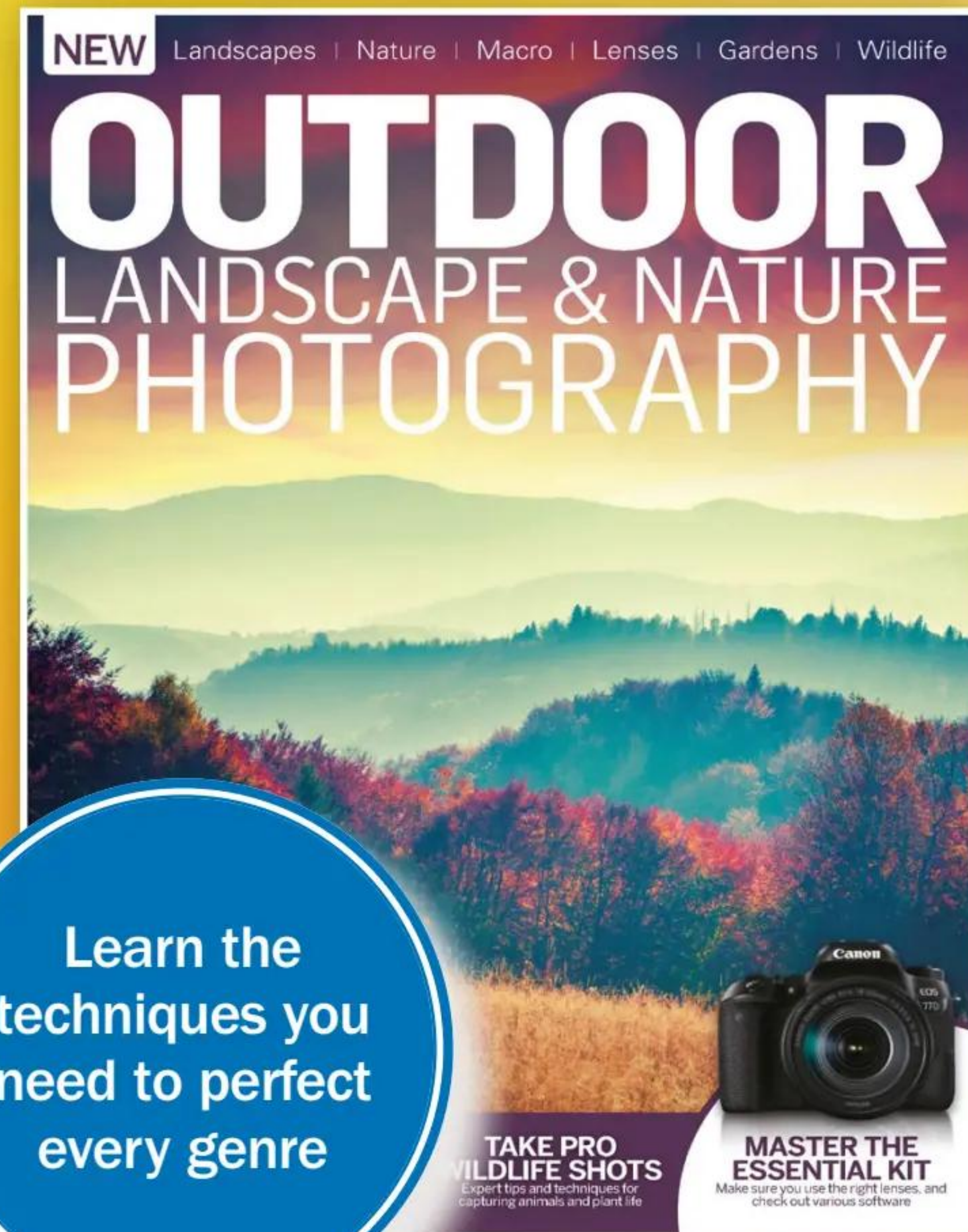
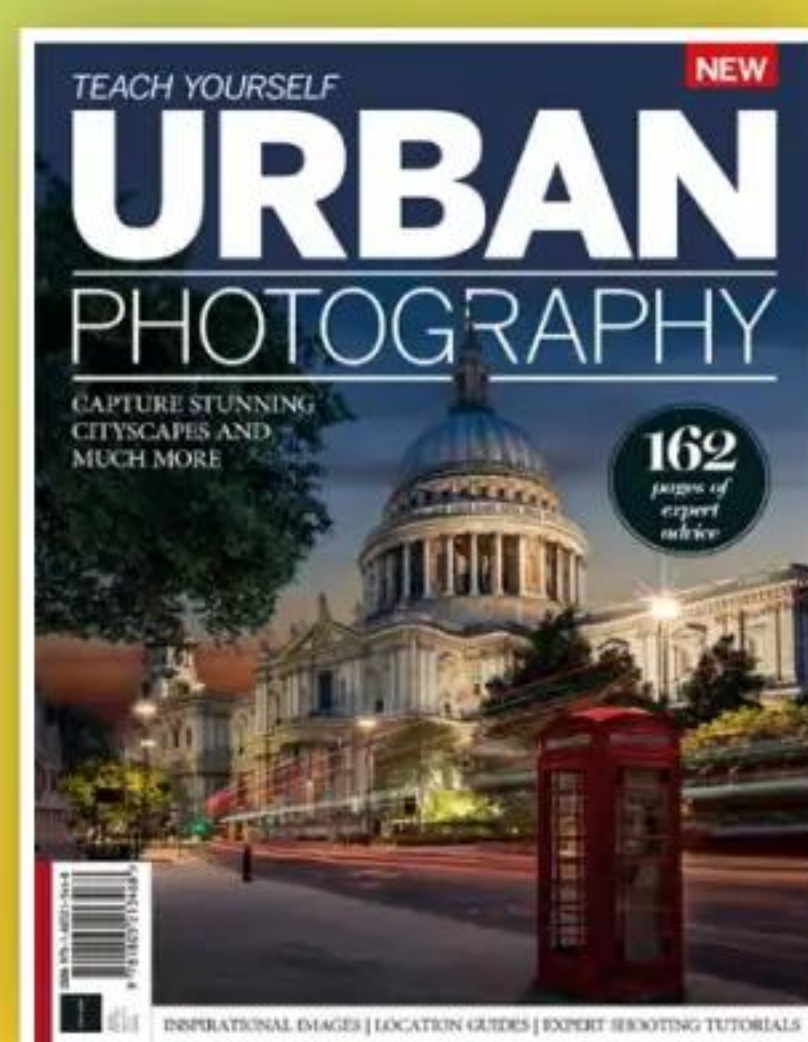
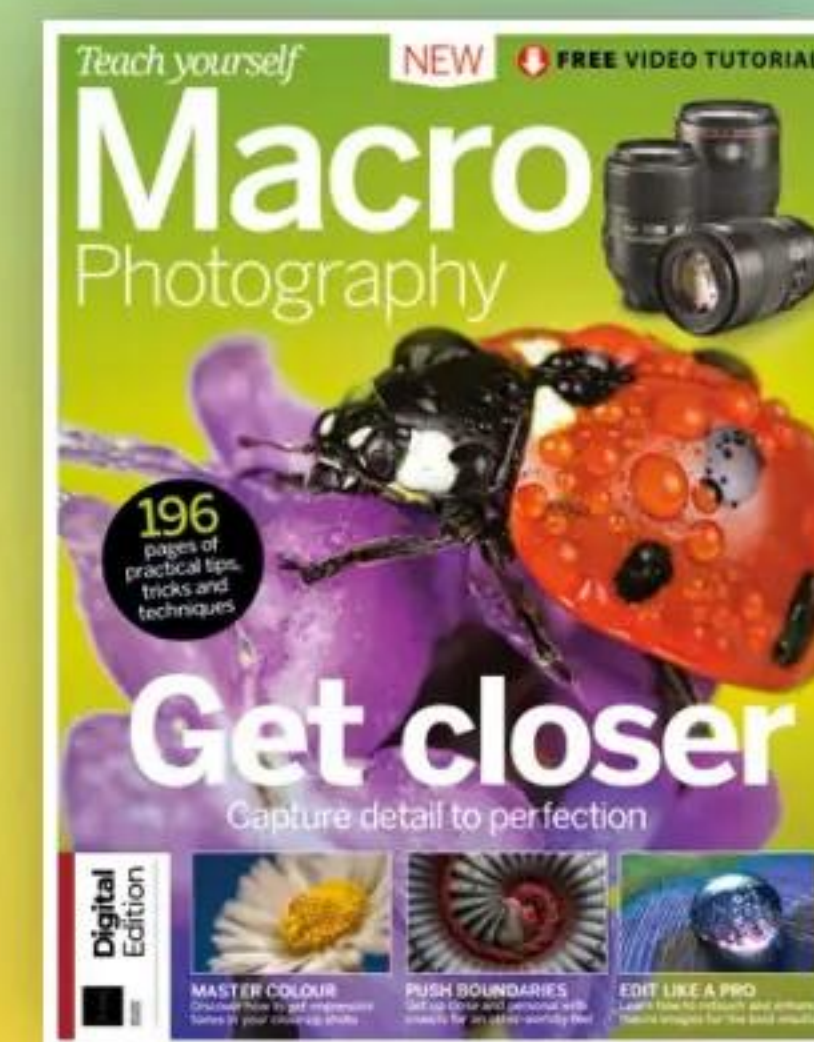
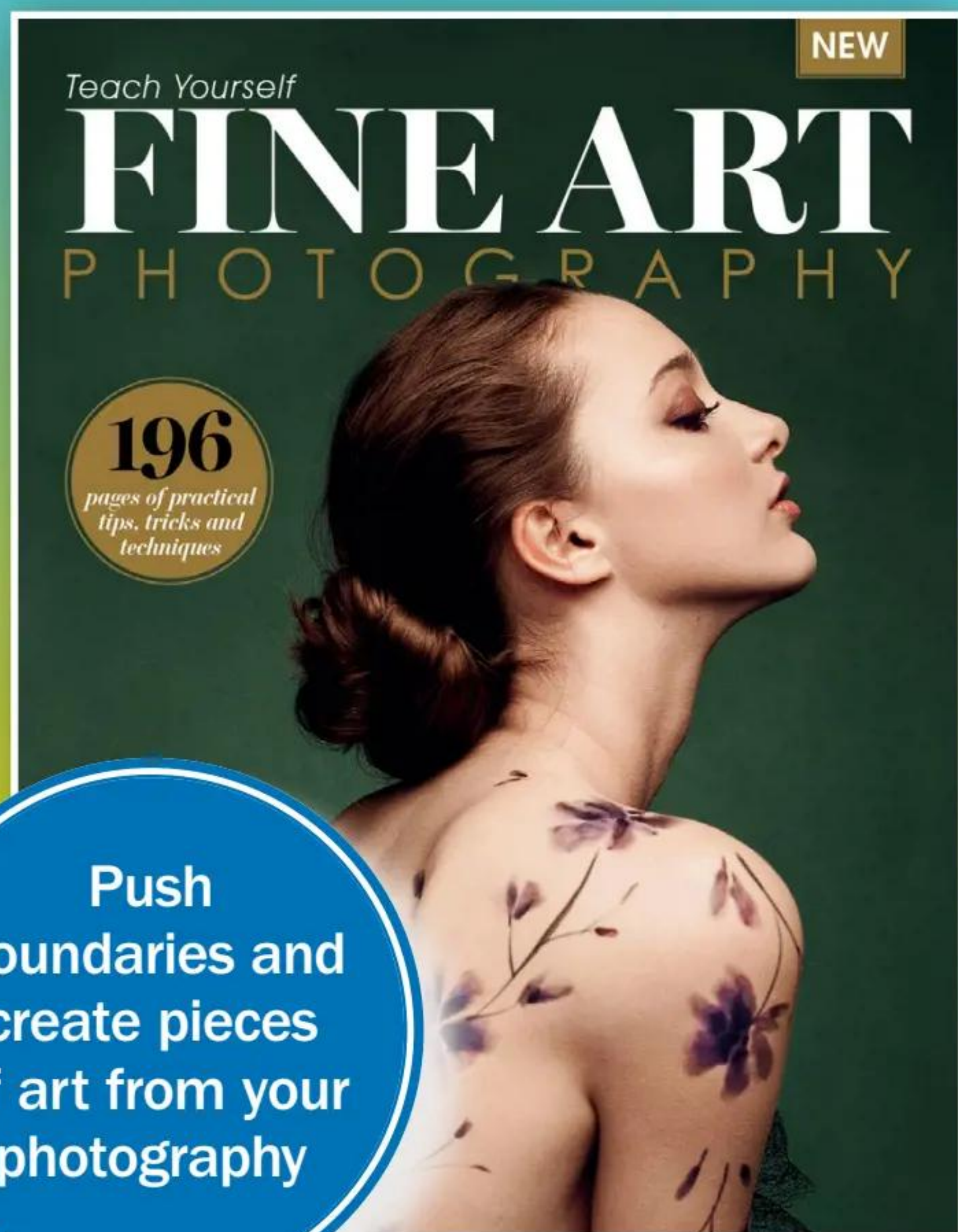
VERDICT

PROS: Keen price; grippy feet with spikes; well-designed centre column

CONS: Minor play in leg locks; hefty packed size; no monopod feature

WE SAY: Not quite as rigid as the equally bulky Benro, but good value





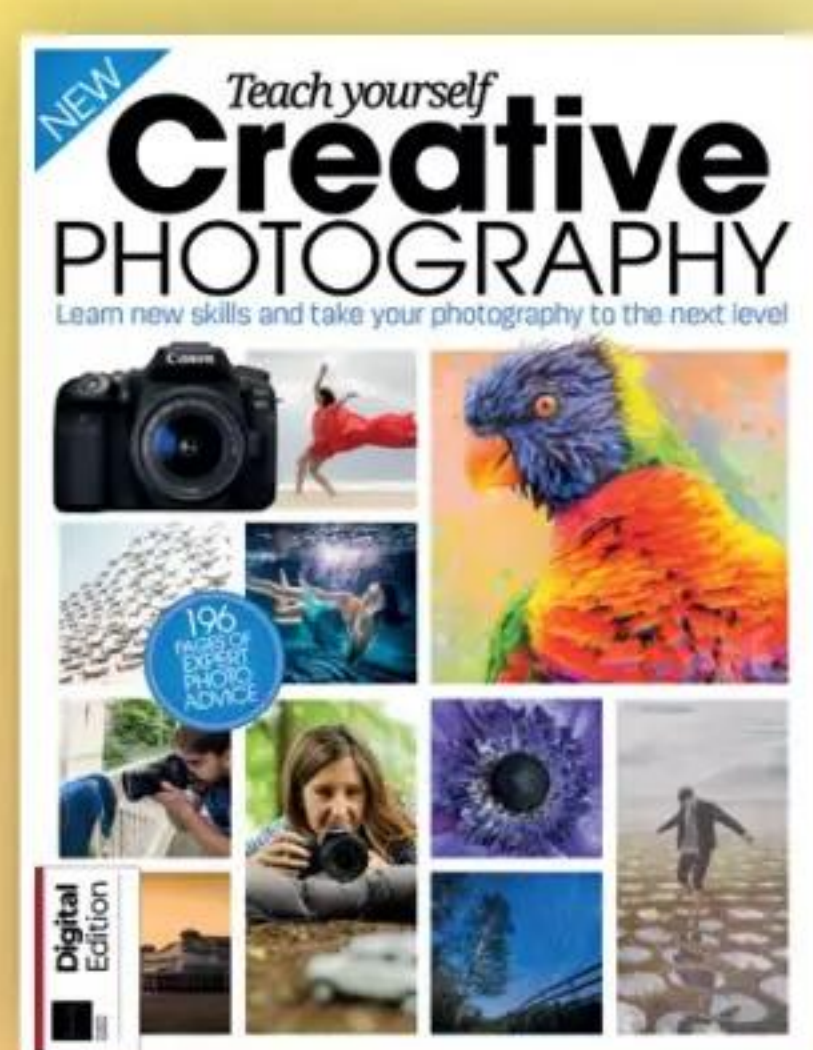
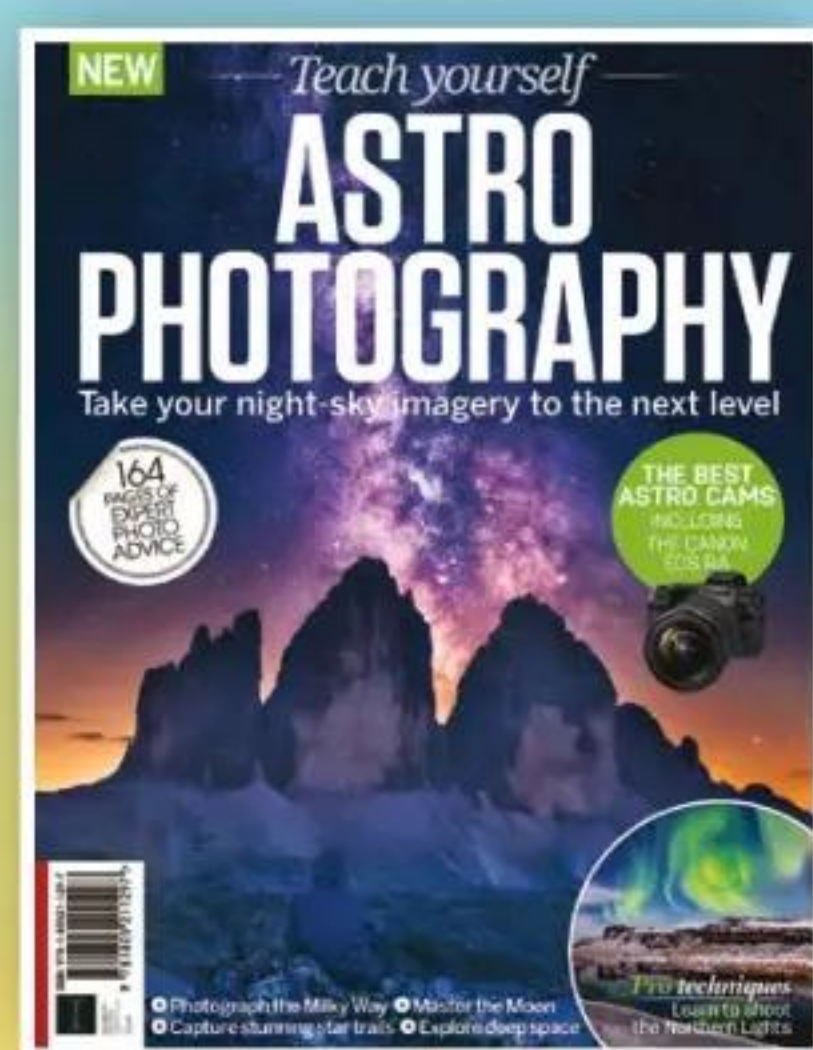
Get great savings when you buy direct from us



1000s of great titles, many not available anywhere else

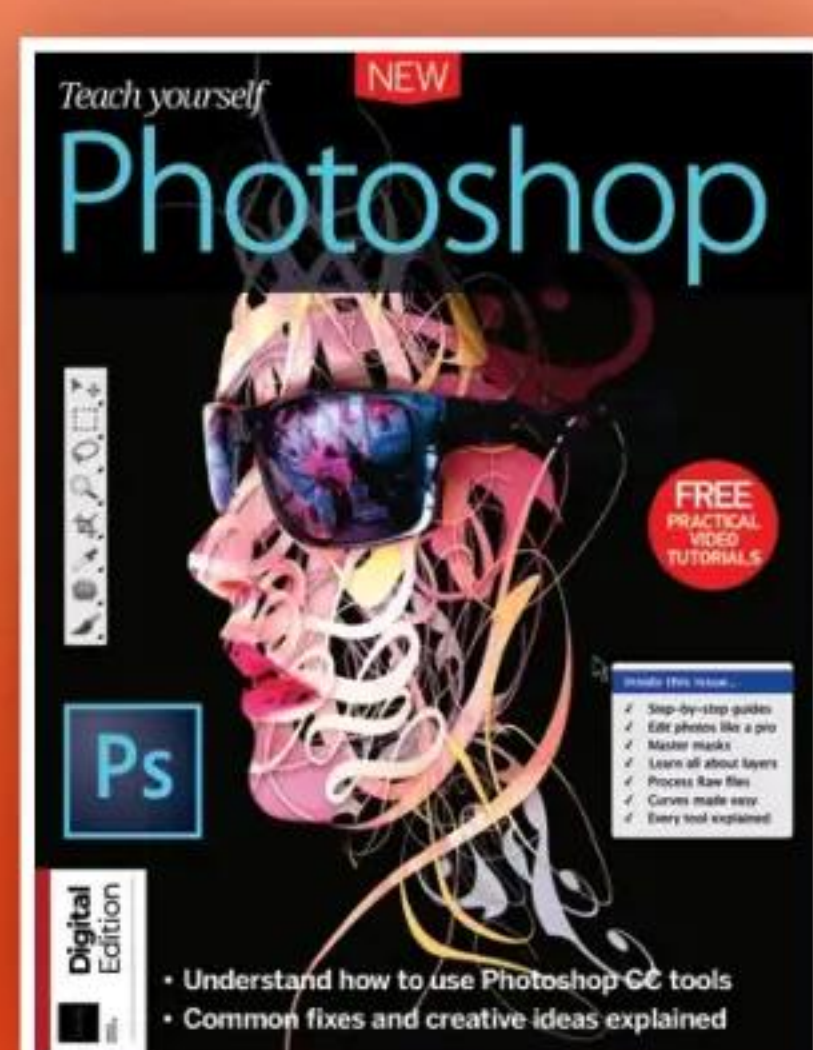
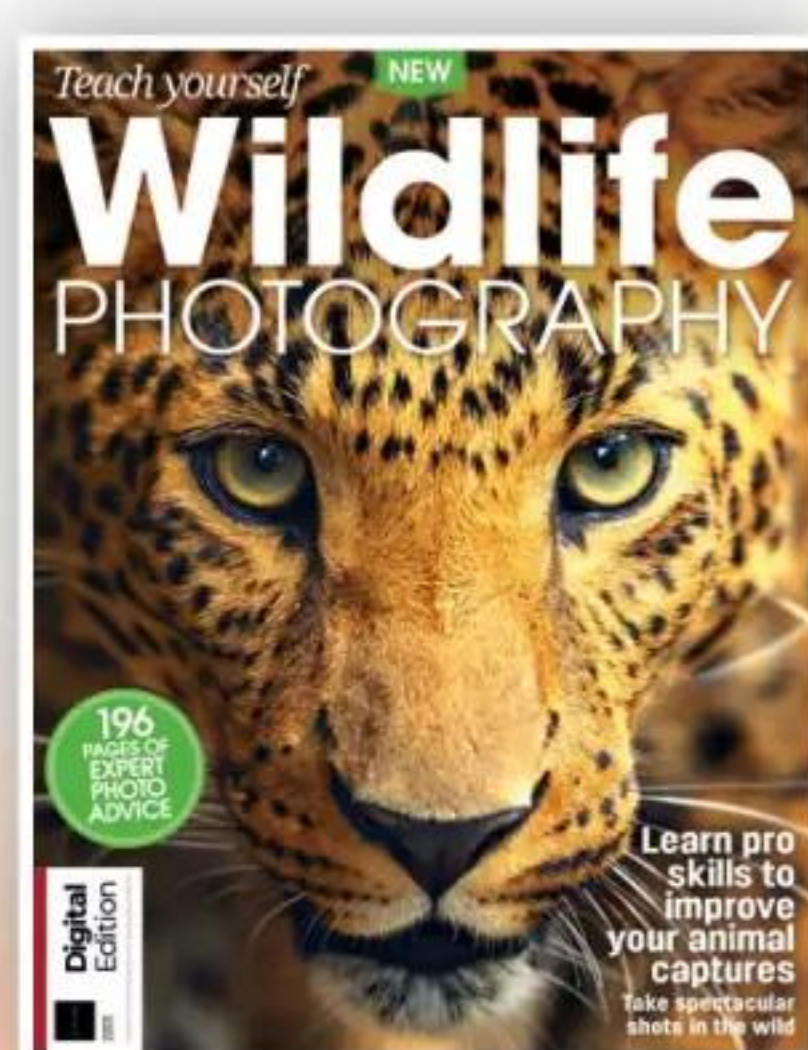


World-wide delivery and super-safe ordering



MASTER YOUR CAMERA WITH OUR BOOKAZINES

From tech to techniques, learn to take better shots with our essential photography guides and handbooks



Professional advice and tips to take your skills to the next level

Follow us on Instagram  @futurebookazines



www.magazinesdirect.com/photography
Magazines, back issues & bookazines.

HOW TO USE FileSilo

EVERYTHING YOU NEED TO KNOW ABOUT ACCESSING YOUR NEW DIGITAL REPOSITORY

To access FileSilo, please visit www.filesilo.co.uk/bks-1531

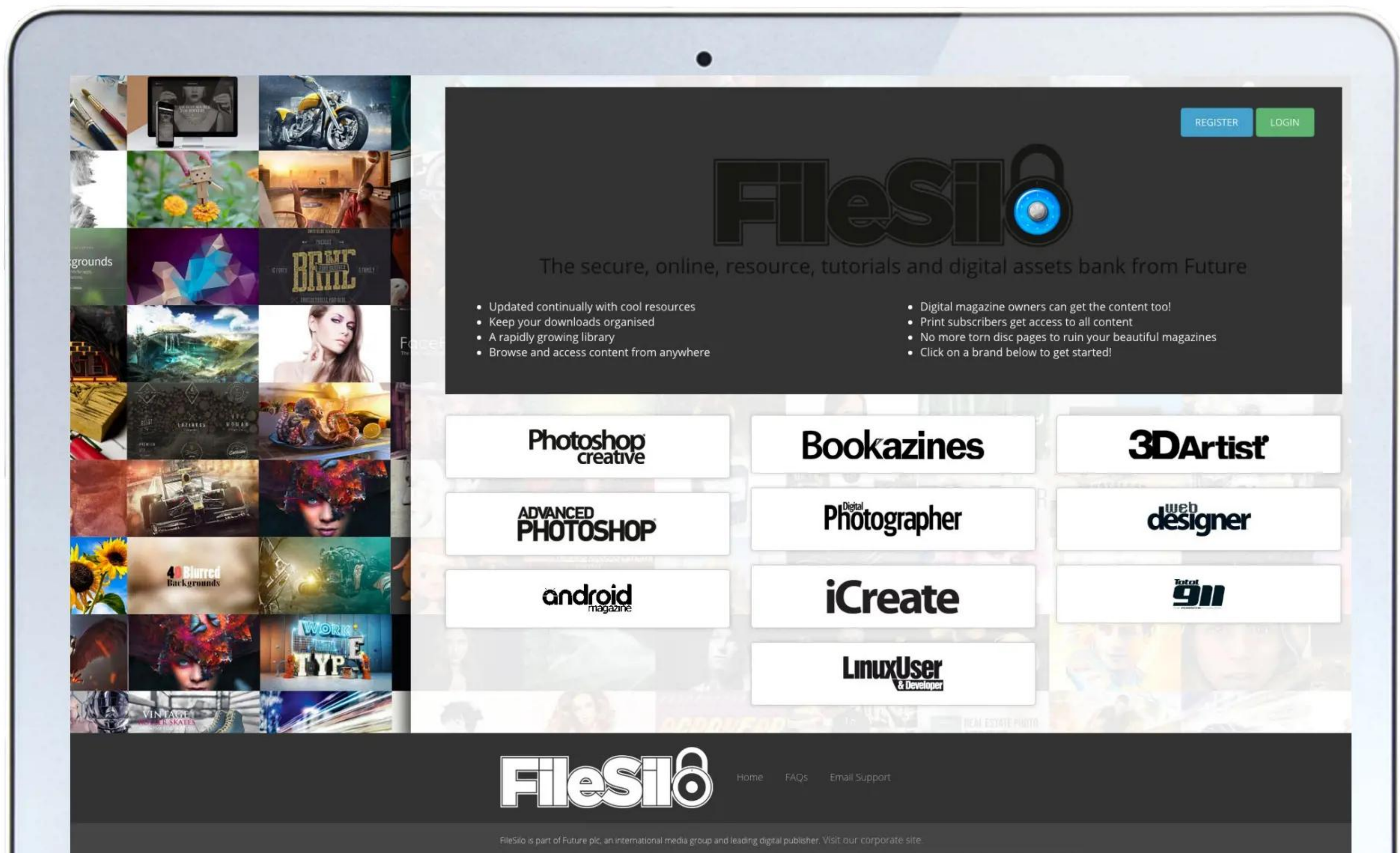
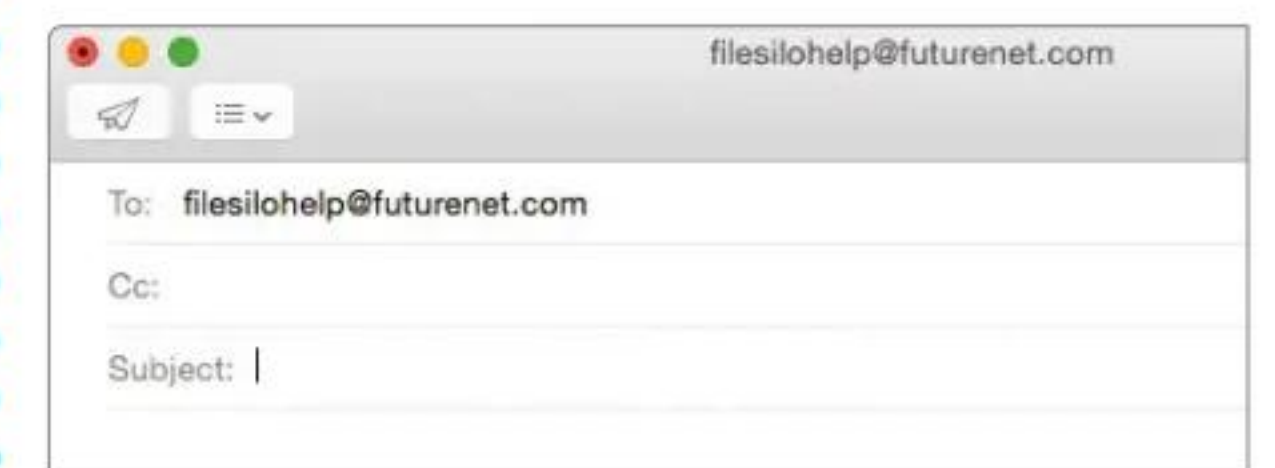
01 Navigate to the above URL. You can then access the content for free at any time, and download it to your desktop.



02 You are now free to explore the wealth of content available on FileSilo, from great video tutorials and exclusive online guides to superb downloadable resources. And the more bookazines you purchase, the more your instantly accessible collection of digital content will grow.

03 You can access FileSilo on any desktop, tablet or smartphone device using any popular browser (such as Safari, Firefox or Google Chrome). However, we recommend that you use a desktop to download content, as you may not be able to download files to your phone or tablet.

04 If you have any problems with accessing content on FileSilo, or with the registration process, take a look at the FAQs online or email filesilohelp@futurenet.com.



Canon

LEARN
NEW
SKILLS

Photographer's Handbook

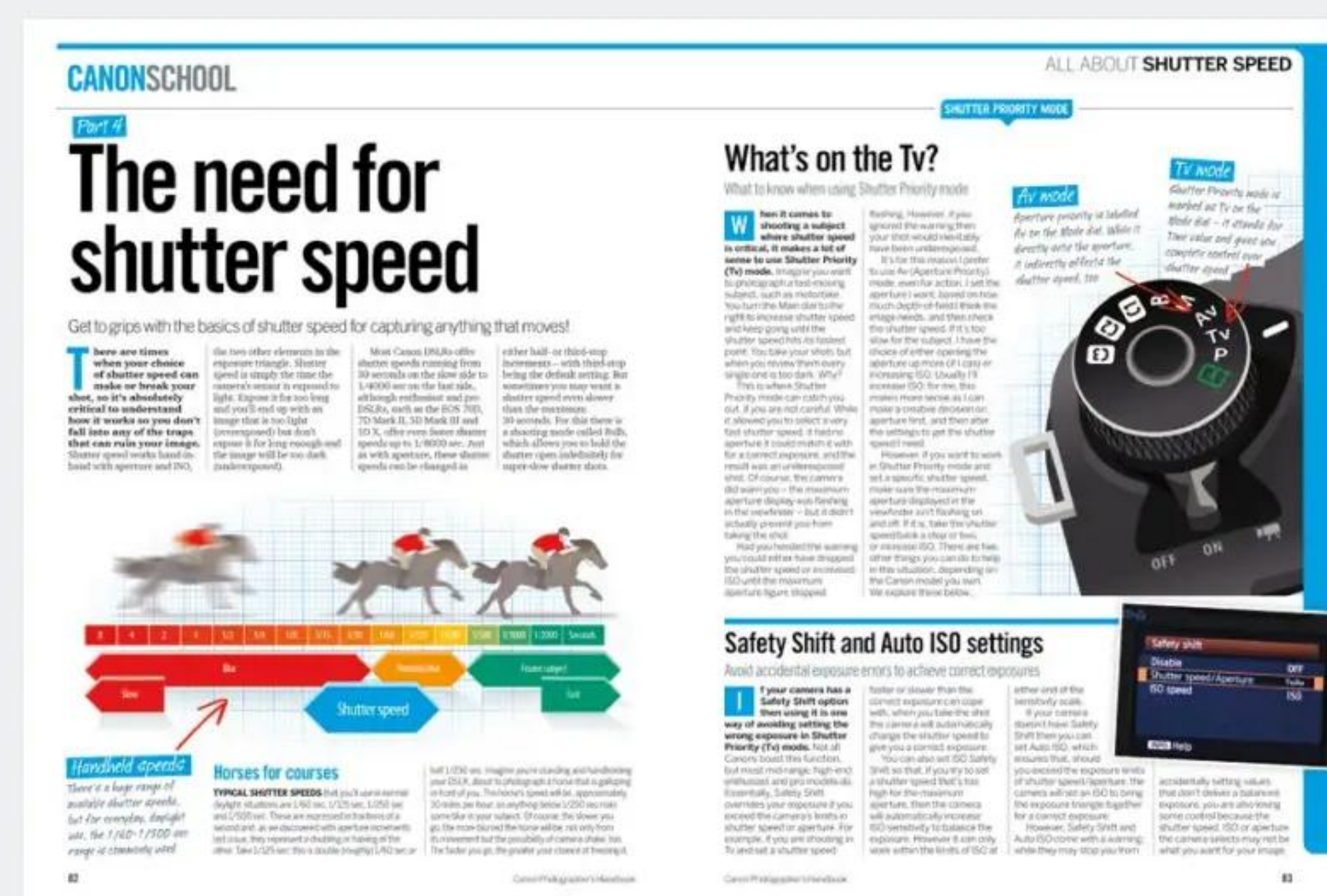


Take your photography to the next level and discover essential EOS techniques. Follow the in-depth camera tutorials and photo projects that will help you master your Canon camera today!



Camera Skills

Follow our easy advice to instantly improve your Canon photography



Canon School

Master essential camera settings with our expert tips and tutorials



Photographer's Apprentice

Learn new techniques as top Canon professionals teach our Apprentices



Gear Tests

Discover the latest Canon EOS R mirrorless cameras & essential kit